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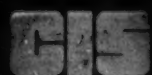

S. HRG. 100-21

COASTAL ZONE MANAGEMENT

HEARING

BEFORE THE

NATIONAL OCEAN POLICY STUDY

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON

COASTAL ZONE MANAGEMENT

MARCH 12, 1987

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COASTAL ZONE MANAGEMENT

THURSDAY, MARCH 12, 1987

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
NATIONAL OCEAN POLICY STUDY,
Washington, DC.

The committee met, pursuant to notice, at 9:30 a.m., in room 253, Russell Building, Hon. Ernest F. Hollings (chairman of the committee) presiding.

Staff members assigned to this hearing: Mike Nussman, professional staff member and Bob Eisenbud, minority professional staff member.

OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. The committee will come to order.

This morning we commence our first hearing on the National Ocean Policy Study, emphasizing the effectiveness of our Coastal Zone Management Act and policy.

I remember back in 1970, 1971, we had a series of over 15 hearings. We were looking for comprehensive administration of the coastal zone.

Other agencies have come in, without any kind of previous operation in the coastal zone. And on the other hand, the lack of support by this administration for the policy and program has put us into a position whereby we do not have comprehensive administration of the problems in the coastal zone.

And as a result, the comprehensiveness has suffered. And it is long since time we picked up the slack here and tried to get a reemphasis on coastal zone management, and find out exactly where we are from some of the experts.

We are here this morning to review the effectiveness of coastal management activities around the Nation. This is the first in a series of hearings by the National Ocean Policy Study and the Commerce Committee that will address coastal issues.

During the early 1970's, this committee focused on a variety of coastal concerns. Fifteen hearings were held on coastal issues in 1970 and 1971 along. Some of the committee members here today will recall our sense of achievement when this effort resulted in the passage of the Coastal Zone Management Act of 1972. In passing the CZMA, we recognized that rapidly growing population demands threatened the limited and often fragile resources of the coastal zone. The CZMA provided the first comprehensive tool to coordinate Federal and State objectives and activities along the coast and on the Continental Shelf. The act anticipated continued

development in the coastal zone. To deal with this pressure, we created a Federal-State partnership for comprehensive planning and management.

As we expected in 1970, the population growth in our coastal areas has been astounding. In South Carolina, the Grand Strand experienced a 1500-percent increase in population between 1945 and 1980. The trend is nationwide. While agriculture and heavy manufacturing in the heartland are slumping, service industries along the coast are booming. By the year 2000, I understand that more than 80 percent of Americans will be living within 50 miles of the ocean.

So today, as we approach the fifteenth anniversary of this committee reporting the Coastal Zone Act, it seems appropriate to review the effectiveness of coastal management. For my own State, I am aware and proud of the achievements of the South Carolina Coastal Management Program. Besides handling an ever-increasing number of permit applications for new activities in the critical zone, the State program is involved in a long-range water quality project. This study looks at point and non-point source pollution impacts and establishes a comprehensive water quality monitoring program. The results of this work will guide development in the years to come.

In addition, South Carolina, working with the National Weather Service, has been successful in using a computer model to forecast hurricane impact. I understand this model has already been used by local emergency preparedness directors during several storms and has resulted in considerable savings to local governments. In the future, this information will be quite useful in making long-range planning decisions to further safeguard our coastal residents. While I am pleased with the progress of South Carolina and other State programs, the condition of the National Coastal Management Program concerns me.

In recent years, other committees have been active in coastal management. Their interest has resulted in the passage of several pieces of legislation like the Coastal Barriers Resource Act and the Clean Water Act which assist in managing coastal resources. These laws, while useful management devices, are administered by agencies other than NOAA and often have not been fully incorporated into the CZMA. As a result, by vision of CZMA as a comprehensive management tool has suffered. Additionally, the Reagan administration's repeated attempts to cut the Federal funding for CZMA have hurt the national effort.

So today, some fifteen years after the CZMA's passage, I am looking forward to an assessment of the effectiveness of our coastal management efforts. I welcome the witnesses and thank them for their participation.

Senator Stevens?

OPENING STATEMENT BY SENATOR STEVENS

Senator STEVENS. Mr. Chairman, I am very pleased to participate in this oversight hearing on coastal management by the National Ocean Policy Study (NOPS) and the Full Committee.

The coastline of the State of Alaska is, as most of you know, longer than that of any other State of the Union and the well-being of my constituents is critically dependent upon sound management to sustain the vitality and integrity of our coastal zone resources.

As I understand it, this will likely be the first in a series of hearings on coastal zone management. I welcome such an effort as a continuation of this Committee's long-standing efforts to ensure effective coastal zone management which, most recently, resulted in the reauthorization of the Coastal Zone Management Act through fiscal year 1990, establishment of a NOAA Estuarine Programs Office, and amendments of the CZMA to improve the grants to states program.

I look forward to the subsequent hearings on coastal management with the hope that they will provide an opportunity for a careful and balanced examination of the issues, including many of those that will be raised by witnesses today.

I am particularly concerned with two issues: (1) the so-called "federal consistency" provision in section 307(c) of the CZMA; and (2) marine plastic debris.

I raised my concerns about the consistency provision during our consideration of the CZMA in the 99th Congress and agreed to refrain from further action in the common interest of a smooth and expeditious reauthorization. Although I had not expected the issue to arise at this hearing, I note that it has been raised in the written statement of one of the witnesses today. I do not agree with that statement and trust that, if this issue is to be pursued, there will be ample opportunity to arrange for testimony by additional witnesses to provide a full and balanced record for our consideration.

My second specific concern involves the problems caused by marine plastic debris, which kills thousands of living creatures each year, fouls vessel propellors, and litters our beaches. It is, of course, much more than a coastal zone management issue, and requires a major effort by many federal agencies as well as state and local jurisdictions and virtually every citizen who is involved with the discard, discharge, loss or abandonment of plastic materials. This is, obviously, an appropriate issue for NOPS. I will be distributing for the signature of my colleagues a letter to the President requesting that he establish a high level, interagency task force to deal with the problem and look forward to a bipartisan effort to solve it.

The CHAIRMAN. Thank you Senator.

I want to welcome, Dr. Neil Frank.

I keep seeing him when hurricanes start, going a mile a minute. And are you leaving?

Dr. FRANK. Yes, sir.

The CHAIRMAN. Where are you going?

Dr. FRANK. I'm going to Houston.

The CHAIRMAN. Did we have one out there?

Dr. FRANK. Yes, sir.

The CHAIRMAN. Well, I see we had one in Charleston. I will bring it up there.

Well, we welcome you, Dr. Frank. He is the Director of the National Hurricane Center. And we appreciate hearing from you this morning.

Your full statement will be included in the record. And you can give it in full, as you wish, or highlight it.

STATEMENT OF DR. NEIL FRANK, DIRECTOR, NATIONAL HURRICANE CENTER

Dr. FRANK. I will make just a statement or two about it. And then I've got some pictures. I think Susan has got some pictures that she will put before you, and I'll comment about those pictures.

Let me start out by saying that this is not a statement against coastal development. It's never been that kind of a statement.

I'm not opposed to the development of the beautiful way of life that we have along the coastline. But I'm certainly concerned about building deathtraps. And I fear in some sense that may be what we've done, is that we've got so many people in some of the little islands off our coast, that we may not be able to get them all back to the inland areas when we have a hurricane threat sometime in the future.

And I think it's also well to point out that hurricanes are not necessarily freak accidents of nature that are designed to inflict death and destruction on human beings. As a matter of fact, they perform a very useful service in the atmosphere.

We get too much heat in the tropics; not enough heat in the polar latitudes, because of the way the sun shines on the globe. You've got to get rid of that heat in the summertime in the trops. And nature has a very effective way of doing it. It's called the hurricane.

So when the hurricane forms, it really represents the tropical atmosphere boiling. And then when the hurricane moves into higher latitude, heat is removed from the tropics, and it becomes tolerable to live in the tropics.

Now, if human beings would learn to live in harmony with the forces of nature, we could certainly minimize our problem. And if we go and develop the little islands along our coastline, then I question whether we'd ought to fuss about hurricanes or not, because we certainly know that hurricanes are going to come along our coast every few years.

So be it. We've decided to do so. And now we have literally thousands and tens of thousands of people along the coastline, and it really has created a major problem for us.

There's two misconceptions, I think, that we need to highlight here today. Number one, I don't think that most people who live along the coast realize how long it takes to evacuate.

An example of that was a study that was completed in Sarasota, Fla., a few years ago. And a number of residents were asked how long they thought it would take to evacuate the islands off the Sarasota area.

And most people responded, well, maybe an hour and a half or so. Well, the real time to evacuate that community is 16 hours. And we now have comprehensive evacuation plans that shows that the evacuation times in some of our major population areas is

going to be on the order of 20 or 30 hours; and there's a question in my mind whether we're going to be able to provide that kind of lead time in some future meteorological surprise.

The second misconception is, most people believe that we're forecasting a lot better than we are. And I give a lot of talks along the coastal areas each year. And I ask people, why do you think that we are forecasting better?

They said, well, we can go home tonight and turn on our TV, and see that beautiful display of weather, the satellite pictures and the radar, and they're in motion and in color. And we have this animated weather marching across our screen. You must be doing a great job forecasting.

I said, no, we're doing a great job of observing and communicating that observation.

So the combination of the lack of being able to forecast as accurately as I think some people perceive, and the last of understanding of how long it really takes to evacuate the coastal areas has created a real dilemma for us.

And I'd like to refer to the pictures now to show you some of the kinds of problems that we've got along our coastline, if you have that set in front of you.

The CHAIRMAN. Just hold on there a minute.

Dr. FRANK. Yes, sir.

The CHAIRMAN. Now, let's talk about the first things, so you and I can make a record here.

We had a similar problem with respect to earthquakes. Some 16 years ago, I guess, Senator Pierson and myself, we went out to the West Coast, to the San Andreas fault. We had earthquake zones and everything else like that for the San Angelo fault, I think, and there was another one.

And then I visited, of course, in China. And if you go in the downtown Beijing, they've got anywhere from 50 to 75 miles of underground passageways to evacuate. Everybody with his little store is told in the back of the store, dig your hole, dig down to a certain depth, and then make it join with the master passageway and everything else of that kind. And you've got a disciplined people.

If you got into downtown Los Angeles, and you had a hurricane, or you had an earthquake, or you had a nuclear disaster—we got into this with civil defense warnings, you'd cause more people to rack up and get killed out on that highway than you would from the hurricane or the nuclear attack or whatever it is.

We just don't live in safe places—our trouble is, because I'm from here to that mirror at high tide from the ocean, and incidentially I've got a house in front of me. I used to be an environmentalist. Now I'm a peeping Tom.

But there I am. And I know you can't get them off that beach. I mean, you and I can sit up here as—I started to say, as politicians. You're a scientist. But the combination of the two, we're not going to move them.

And the more warnings you give, the more they'll stay and ignore.

Now the updated information that you give on that TV screen tells a story. And if winds proceed, that'll tell an even greater story; that'll move them some.

But if it comes in September, and the kids are just back in school, and it takes 30 hours, you've got to move them away. They miss the school bus. They haven't closed the school down yet, or anything else of that kind, and they're way out there, I think you've got to be thinking of these things as practical problems.

I know the facts. I can give the hours, and I agree with your hours. I'm not going to dispute whether it's 16 hours real time, or should they have 20 to 30 hours notice.

I think you're dead on target there. But how do you get them to realize it? Is there anything we can do to improve, let's say, that forecasting?

You've improved your communicating. Now let's see what we can do to improve that forecasting?

Dr. FRANK. Well, the forecasting is very difficult, because we don't have meteorological data in vast ocean regions where it's so important.

Now hurricanes move along in rivers of air. We have rivers of air in the atmosphere just like we have rivers of water on the ground. The one big difference, in the atmosphere, we don't have river banks. So the rivers move around.

And the whole dilemma in hurricane forecasting is to predict what that river is doing.

Now the rivers that are so important to us in hurricane forecasting are generated over the Atlantic Ocean where we don't have any meteorological data, or very little. We have a few ships at the surface of the ocean, and we have a few jet airplanes flying across the top. And we can look down from the eyes of the satellite and track some clouds.

But we don't have a lot of data in the middle of the atmosphere where the river is so important. And until we get data there, then we're probably not going to have major improvements in our forecasting skills.

The CHAIRMAN. How would I get data there?

Dr. FRANK. Well, that's a very expensive problem. And I don't think that this country could probably buy into that. Economically it's not going to be feasible——

The CHAIRMAN. Has anyone—I mean no country has it?

Dr. FRANK. No country has it. Now, in the future I do believe that maybe someday we can get some information that would be important to us from some kind of remote sensing. That's why satellites are so important to us.

And the technology is not there today. But that doesn't mean that at sometime in the future that somebody may be able to develop some technology that would allow us to see what's going on in the middle part of the atmosphere.

But economically, it's just not feasible to put weather ships all over the Atlantic Ocean.

The CHAIRMAN. Just give me an encapsulated cost. What would it be, when you say economically? In order to do it, what would I do?

Dr. FRANK. Well, today, without some kind of technology from remote sensing or satellites, then the only means that we would have is to put weather ships every 100 miles over the Atlantic Ocean.

And one weather ship in one location is a multimillion dollar operation. And so it's economically not feasible.

The CHAIRMAN. I understand, and I appreciate it very much. But keep that in mind, and tell us how to do it better. Because they'll listen to you; you've got credibility.

But the local fellow, it's too often, you know, that they've said, it's going to come in; it's going to hit. And they say, oh, no, it'll go below or it's go above. Even though they'll say one's coming. Yeah, I believe one's coming, but it's not hitting here.

You know what I mean? It's going down at Hilton Head, or that's going to hit up at Wilmington. So we don't have to worry. And they just continue to sit.

Well, now, we've got some good Members present now. And Dr. Frank has just started with his opening. And you've got a set of pictures for each of us. All right, let's go right into that.

Dr. FRANK. Yes, sir. I've got a set of pictures. And I think the story in these pictures tells it all better than I can state it.

Now, in the first set of pictures you'll see a home on Dolphin Island. Now in 1985, we had an awesome hurricane as far as the United States is concerned. We had eight named storms cross this coastline. Four billion dollars worth of damage.

We're at the point in history now where hurricanes are billion dollar storms, and it could be several billion dollars in some of our major populated areas.

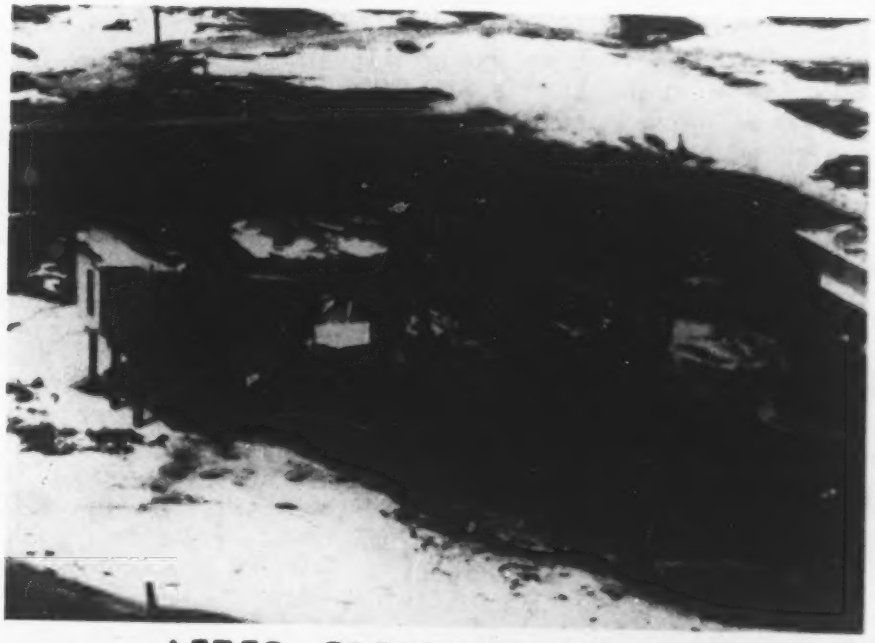
The center of this storm, Elena, one of the most significant storms in 1985, went right across the Mississippi Coast, and in the process of reaching Mississippi, it crossed Dolphin Island.

Now the first picture you see in the upper left shows a house after Elena in 1985. Notice the roof is gone and the right wing is gone.

In the lower left you'll see that same house after Frederic in 1979. And I've been told Senator that there was a tornado on the island two years ago. And it got one house—this one.

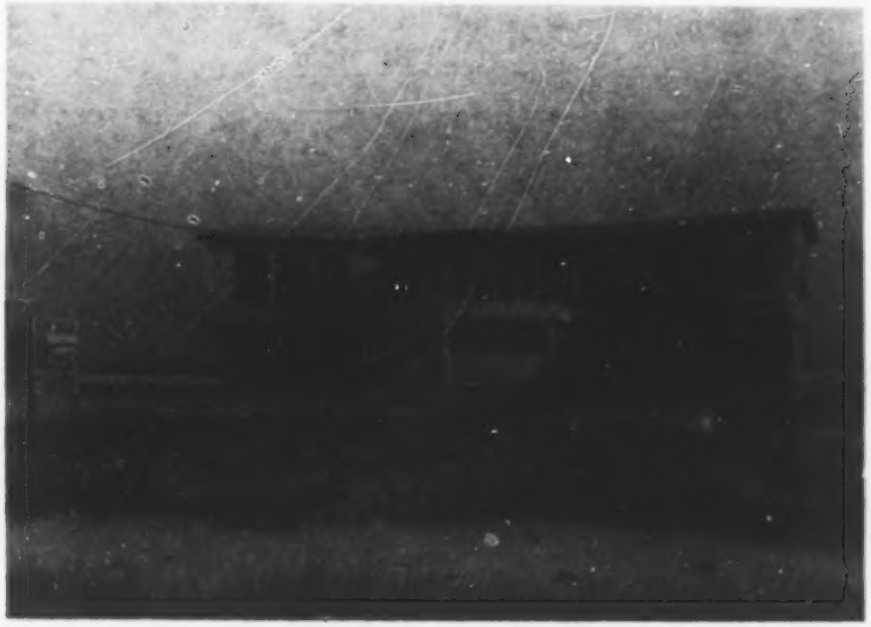
Third time this house has been destroyed since 1979. Well, it's been rebuilt again. You can see it in the upper right. But if you'll look carefully, you'll see an interesting addition in the front yard? Over on the left side, there's a for sale sign.

HOME
DAUPHIN ISLAND, AL



AFTER FREDERIC, 1979

AFTER ELENA, 1985



REBUILT, 1986

Dr. FRANK. This may be the best buy on the Gulf Coast, I want you to know. If you've had a house destroyed three times in a decade, the odds are with you that you can go a long time without having an impact.

The CHAIRMAN. Senator Bentsen, the distinguished oceanographer and scientist is going to Houston, so he'll be out there selling you these homes.

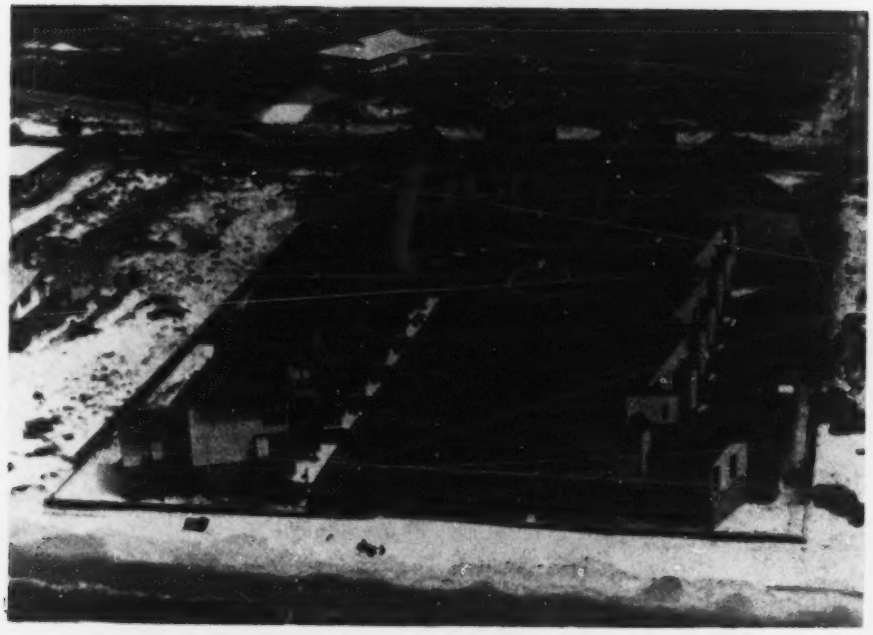
Dr. FRANK. Now, if you'll look at the second page of pictures, I'd like to go to Gulf Shores, Alabama. Now, this is on the east side of Mobile Bay.

The beach house condominium, before Frederic, 1979, you see a nice U-shaped building. Now it's interesting that this building was built according to the standards of the federal flood insurance program. In other words, the floor level was 11 feet above mean sea level.

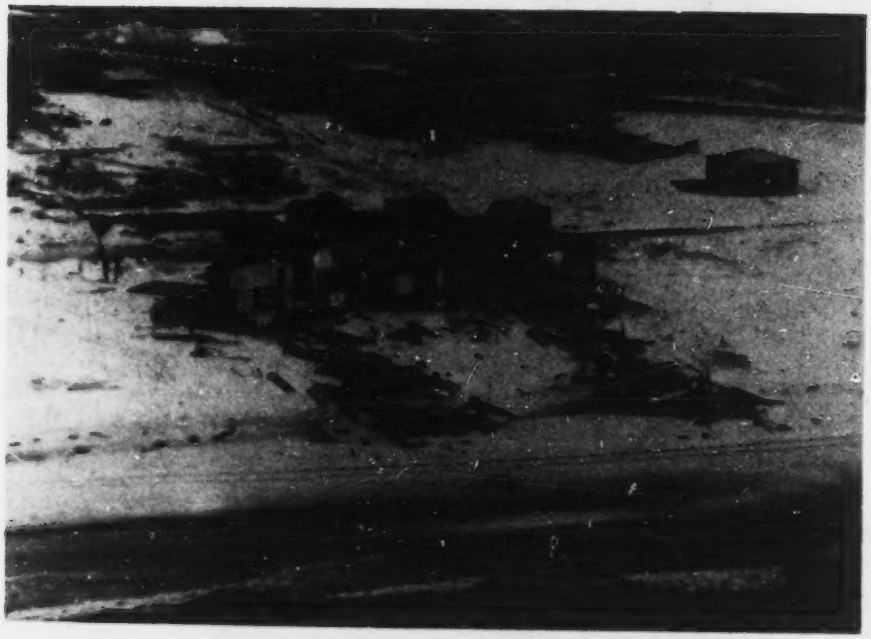
A 12-foot storm surge rolled in, and that's the results. You can see both wings were totally destroyed.

Well, they've rebuilt it again. You can see the rebuilt in 1982. And then we had some winter storms in 1982, not bad ones, but each one of them had a little bit of wave action; knocked the sea wall down. And if you look at the next page, you can see that both of the wing units were undermined.

BEACHHOUSE CONDOMINIUM

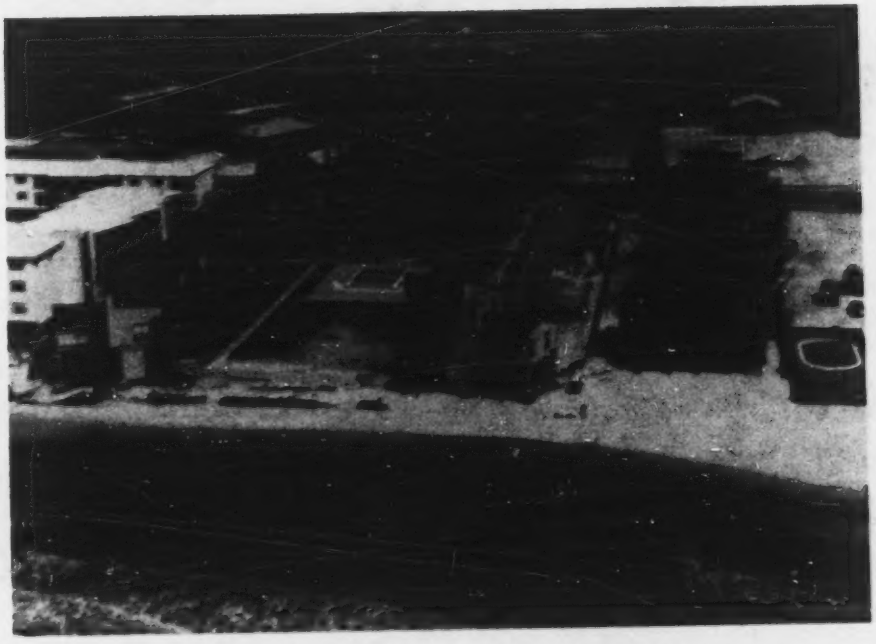


BEFORE FREDERIC (1979)



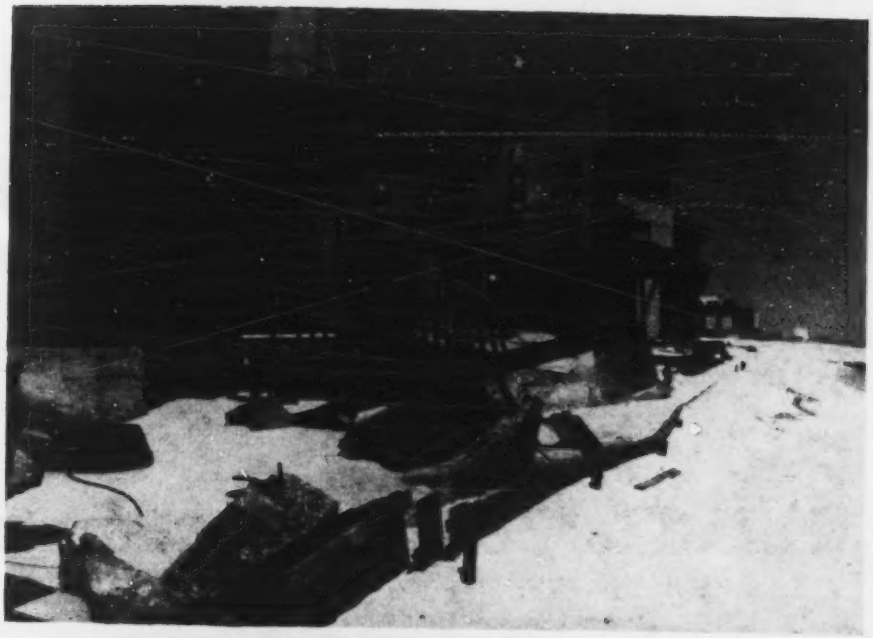
AFTER FREDERIC (1979)

REBUILT AFTER FREDERIC



AFTER 1982 WINTER STORM

BEACHHOUSE CONDO



AFTER 1982 WINTER STORM

AFTER ELENA (1985)

Dr. FRANK. And then we rebuild it again. And then Elena comes along in 1985, and look at that. Sea wall knocked down again, and both the wing units are undermined. Third generation of damage since 1979.

Now, let's take the airborne. See the aerial view there? I want to make a couple of points on that picture.

Please note the only place that the beach is retreating: right where you've got the sea wall. You see, on a day like today, the wind blows, picks up the grains of sand, and builds up a nice sand dune.

GULF SHORES, ALA.

1982

Dr. FRANK. Then the storm comes along. The water rises. The waves reach up to the dune, grab the sand on the dune, spread it back across the beach, and when the storm's over, you've still got a nice beach, but you don't have a sand dune. But that's okay, the winds will blow again tomorrow, and they'll build that sand dune up again.

Now one day we discovered we wanted to go down and live by the water. Now the actual fact is, we want to live in the water. We've got to get right out at the high water mark, right? So we want to live right in the water.

Now we put our house out there, and we notice that there's a little erosion. We've got to protect the house, that's a cardinal rule on the beach, so we build a sea wall.

Here comes a storm, reaches up, the waves reach up for the sand dune, but there's no dune. So it takes the sand from in front of the sea wall and excavates it seaward. And that makes bigger waves, or more powerful waves, which knocks that seawall down. Which means you can rebuild it bigger. Which makes bigger waves. Which knocks that one down. Which means that you can rebuild it again.

And where does that whole story end? Well, when the cost of building the sea wall exceeds the value of the property. That's about where we are in a couple of places along our sea coast.

The CHAIRMAN. That's interesting. You ought to hold it there just a second about building seawalls. In other words, from your experience, the actual construction of the wall itself encourages the erosion?

Dr. FRANK. Basically, I'm drawing on information from scientists who have done a lot of studies in those areas. Yes, sir, that's right. That's right.

And when you start doing manmade things to protect your beach, it's an irreversible process. You get into a cycle where it's going to be very expensive to continue to protect it.

The CHAIRMAN. But it's quite obvious after you've built this nice expensive condominium complex right there by the ocean, and the tides are coming in and everything else like that, you're not going to say, well, let's don't build a seawall; let's just let it wash away.

Dr. FRANK. Yes, sir, that's true. But when the cost of that seawall exceeds the value of that condo, we may take another look at it, I'm not sure.

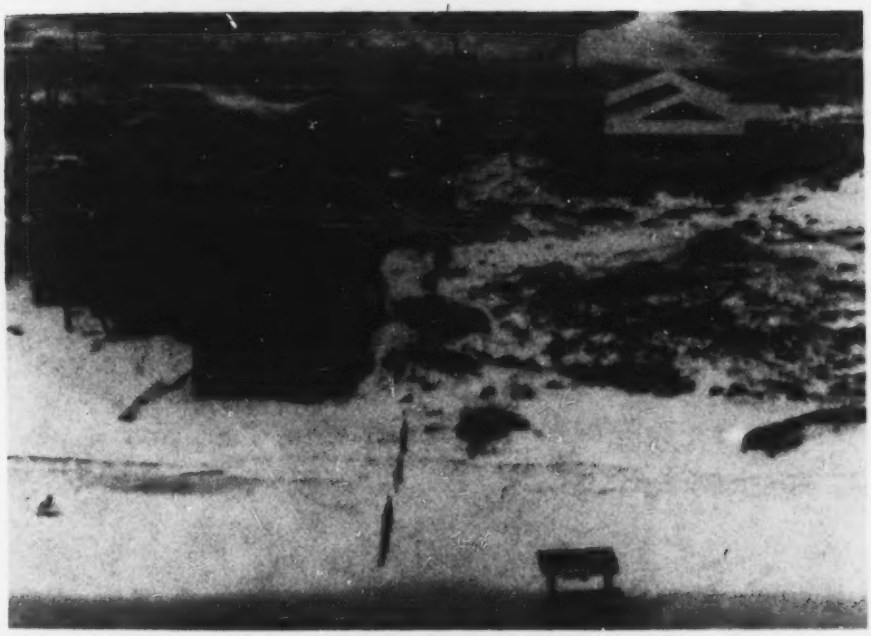
Now, go to the next one. You've got a Tiki Restaurant. You see the little brown building and the palm trees around the parking lot?

The CHAIRMAN. Yes.

Dr. FRANK. All right. Now, after Frederic in 1979, all you had was the palm trees. Now, I want to point out something here in this picture.

Please note that across the road, the building survived. If we get back 100 yards from the waterfront, we could still live on the islands, but we would certainly minimize the dollar damage. And that's one of the points I'd like to make.

TIKI RESTAURANT



BEFORE FREDERIC (1979)

AFTER FREDERIC (1979)

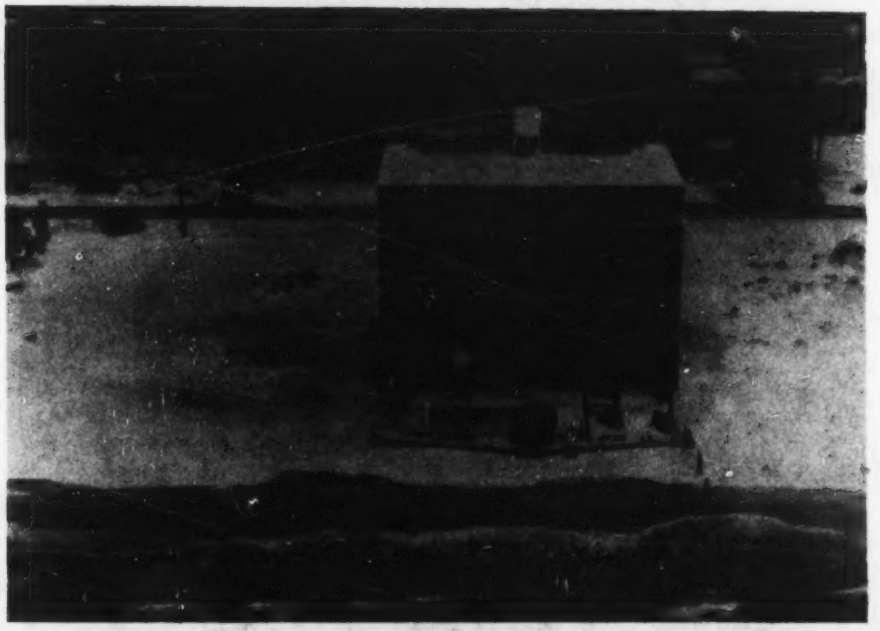
It's the wave action against the building right on the waterfront that is so devastating.

That wave apparently dissipates. And as you go back inland, even the distance of 100 yards, that wave action is a lot less.

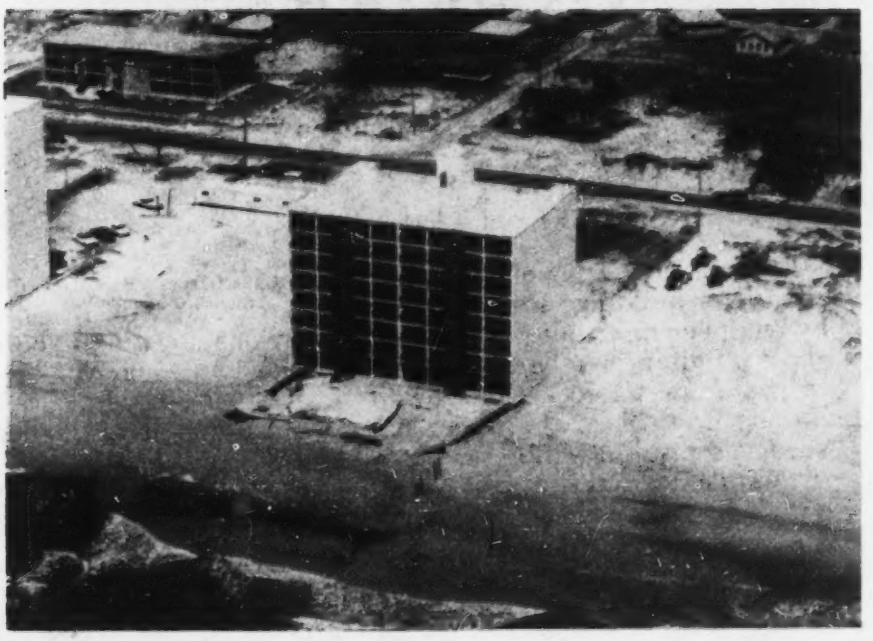
Now, the owner of that restaurant sold that property off to a developer, who put this condominium that you see in the upper right. And then Elena comes along in 1985, and knocks the seawall down and knocks the swimming pool down.

Now, if that condo had been across the street, there wouldn't have been any damage with Elena in 1985. So the point that I'm trying to make here is, we can still live on the beach. But don't—put a green area. Something, a park or a golf course or something there. Let the 18th fairway wash out rather than the condo.

CONDO in FORMER PLACE of TIKI RES.



(1982)

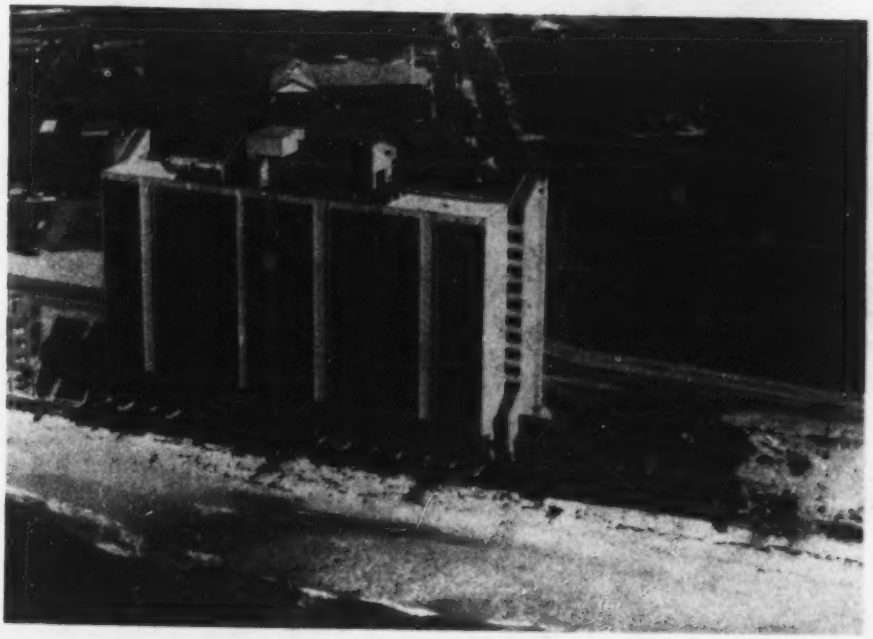


AFTER ELENA (1985)

Dr. FRANK. Now, the last slide—set of pictures I have here is, I would also want you to know that some of the buildings that we have along the coastline are not built the way they were engineered to be built.

In the lower righthand corner, you'll see a condominium at Panama City Beach, Florida, as it appears today. And I assume that the folks are all delighted with their property.

This is what the condo looked like after Elena in 1985. And since they were on the distant fringe of Elena, they really didn't have a lot of damage.



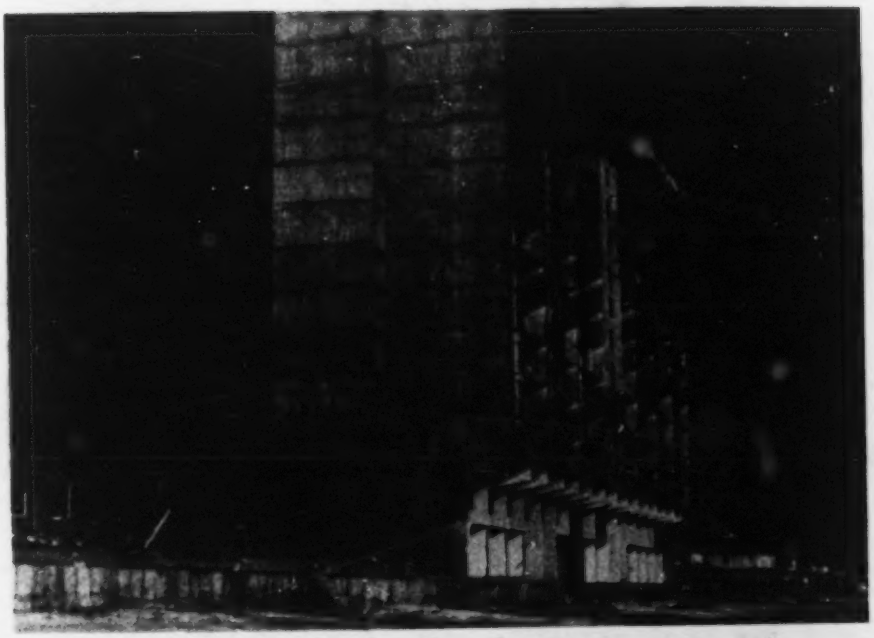
AFTER ELENA (1985)

Dr. FRANK. Now, one of the big points of controversy: Would these kinds of buildings survive a major hurricane? And I've been told by engineering friends that if you put pylons down and you tie the whole building together, yes, the building should survive.

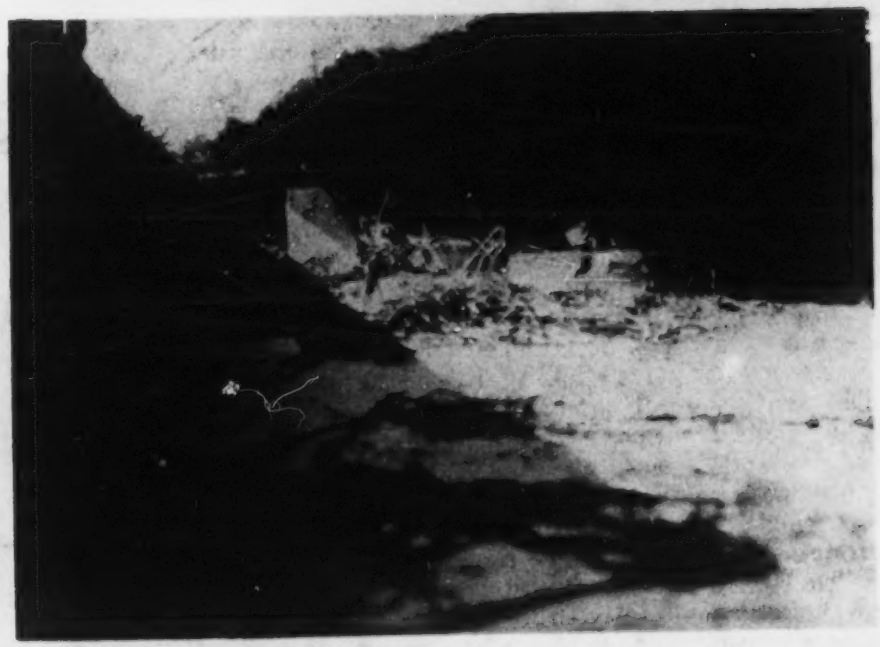
Now, water may knock the seawall down, as it did when Eloise came along in 1975, in the upper left—yeah, upper left, I believe. You see the seawall is gone?

The CHAIRMAN. Right.

PEPPERTREE CONDOMINIUM



AFTER ELOISE (1975)



AFTER ELOISE (1975)

AFTER ELOISE (1975)

Dr. FRANK. And you also see that the water came through the ground floor and knocked the walls right off that building. As a matter of fact, water went up underneath the foundation of the building and excavated three or four feet of sand.

And it was interesting to see. Well, it's on pilings, so it looked like the building had survived reasonably well. Then we took a closer look at the pilings. You see those metal rods? There were 90 pilings under that building; 36 of them had no concrete around the top of them.

And I was showing these pictures a couple of years ago. And a young man came up out of the audience and said, you want to know what happened there?

And I said, yeah, how do you know? And he said, I worked on the building. I said: Tell me about it. He said: Well, we drilled the holes down in the sand. Poured the concrete there for the pilings. Left these metal rods sticking up just like we were supposed to.

The next stage of construction is to build the wooden forms for the horizontal support of the building, or the foundation of the building. And he said, we did so.

He said, a couple of days before we poured the concrete for the foundation of the building, it rained, and sand washed down to the bottom of the forms, and we never cleaned it out.

So there are a lot of buildings out there that don't have the construction that we really think it has.

And I would trust, as you continue your very interesting and important deliberations on the coastal problems, that you would give

proper consideration to the human resource. There is a human resource there that badly needs some protection.

Senator EXON. Mr. Chairman, could I ask, I don't know much about hurricanes. We haven't had one for several years in Nebraska.

And listening to your very interesting testimony, I was struck. Are there no building restrictions on where you can build a house or a condominium in our hurricane prone states?

Dr. FRANK. Yes, sir, they have some. And basically, that is a local ordinance to begin with with some oversight at the state level.

Senator EXON. Are you suggesting there should be some federal legislation in this area?

Dr. FRANK. No, sir, I'm not suggesting anything. I'm just saying we've got a problem, and it is not—we obviously don't have the solution to that problem right now, because we continue to see thousands of people come to the coastline and build in these very vulnerable areas.

Senator EXON. But as an expert in this area, now we've identified the problem, what do you suggest that we do about it?

Dr. FRANK. Well, I think that there are two aspects of the problem, and we need to separate these out. Number one is, there is a human resource. There's lives out there, and we need to do everything we can do to protect those lives.

And number two, there is a dollar resource out there, and even back in Nebraska you ought to be interested in what those dollar resources are. I'm a native of Kansas, and so I appreciate that part of the country.

And my good friends in Kansas are getting tired of subsidizing the way of life for those who live right there on those beaches.

And so I appreciate what you're saying.

Senator EXON. That was exactly my point. I assume that a considerable amount of Federal money through FEMA was expended on assisting for the repairs of some of these facilities that you have outlined; is that right?

Dr. FRANK. Well, that would be through the Federal flood insurance program, yes, sir.

Senator EXON. Well, Mr. Chairman, I hope that we don't have to get Federal legislation on this. But maybe it's appropriate that we put some minimum restrictions of some kind on where we build. We're going through it right now in the Midlands on flood plains, with very strict interpretations.

You can go ahead and build anything you want in the flood plain, but don't be coming back to us and saying, this is a terrible tragedy that I can't afford and have the taxpayers pay for.

Likewise with insurance. So I thought that the basic mixture that we had established, with some subsidized insurance in certain areas, where people had built before there was warning, or before flood plains were adequately defined, maybe were in order.

But it seems to me that we should tell people in the free enterprise system that they're free to do what they want within certain guidelines, but it's not going to be free for the taxpayer to come along and fix up the properties that were built where there's a high probability of a more than normal disaster.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Bentsen?

Senator BENTSEN. Thank you, Mr. Chairman. Dr. Frank, welcome to Houston, and you don't have to go to the beach to find a good buy in a home in Houston today.

Dr. FRANK. Yes, sir. I'm aware of that.

Senator BENTSEN. And I might tell you about going to the beach that I'm really concerned about the reduction in the hurricane flights. And you made some comments about that a few weeks ago.

I look at a situation where they say the National Hurricane Center can give us perhaps 12 hours of notice. And yet you've made a statement that it will take 20 to 30 hours to evacuate the Galveston area. Fifteen or so hours to evacuate Beaumont, Corpus Christi.

How can local officials make a sound decision, a critical decision, with the lack of that kind of warning?

Dr. FRANK. Well, I don't mean to overemphasize the 12 hours. Historically we have tried to provide 12 hours. We now know that we've got to provide more lead time than that, because it takes more lead time than the 12 hours.

I don't know why we decided that 12 hours was appropriate. I suppose we considered that in a 12 hour lead time, we'd be wrong 50 percent of the time, and that would be acceptable.

You see, we can go to 24 hours. Only in a 24-hour forecast, for every three times we tell you to evacuate, only once will it be necessary.

We can give you 48 hour forecasts. But in every five or six times we tell you to evacuate, only once will it be necessary.

Senator BENTSEN. Well, it seems even if there is not that much certainty that we ought to have more warning than 12 hours, when it takes us, in an area as crowded as the Galveston Bay area, 20 to 30 hours.

I've worked to put in a priority highway from that area in the highway legislation to try to get that in to help those people evacuate that area more rapidly.

Because I can recall as you can things that happened in Carla, and the immense devastation that we had. And we can save lives if we have sufficient prewarning.

Now when I read your comments and heard about your comments, I wrote the Air Force about it, asking what they were going to do insofar as the reduction of aircraft.

They're talking about reducing the aircraft in support of the weather mission from 16 now at Keesler Air Force Base to only 8.

Is that your understanding?

Dr. FRANK. Yes, sir.

Senator BENTSEN. I'm advised by the Air Force it will commit 1,000 flying hours to the weather mission compared to 1,200 per year now.

Do you think that half of the number of planes is going to be able to do 80 percent of the missions?

Dr. FRANK. Well, some of those aircraft, though, would be assigned to the Western Pacific during the typhoon season.

Senator BENTSEN. And they've deactivated the Guam unit too, haven't they?

Dr. FRANK. Yes, sir, that's true. And that's why they won't be taking airplanes to the West Pacific, as I understand it, as of today.

So the 8 airplanes that we have in the Atlantic will be committed solely to the Atlantic, so we don't have to worry about losing some of those airplanes to the West Pacific.

See, my concern, let me comment on that thing about the aircraft. Aircraft is a very expensive operation. Maybe we've reached the point in history where this nation can no longer afford a reconaissance mission. We're the only nation in the world——

Senator BENTSEN. Well, you just told me how much more expensive the damage has become in the hurricane losses we've had.

Dr. FRANK. Exactly.

Senator BENTSEN. And as those populations increase, and it's more difficult to evacuate them, you have a higher degree of risk there.

Dr. FRANK. Absolutely. But see, one of the points that's being made now in terms of reconnaisance, well, we have satellites, and there are those who believes that satellites are as accurate as reconaissance, and therefore we don't need reconaissance.

Senator BENTSEN. Well, let me touch on that point. I've been advised that Hurricane Earl in 1986 was estimated to have winds of 40 miles an hour on the basis of satellite photos, but the reconaissance flights confirmed it to be a full fledged hurricane at the rate of 80 miles an hour.

So we can't depend solely on those satellites, and it's obvious they've not been completely accurate.

Dr. FRANK. Well, that's been my concern. We really don't know how accurate a hurricane warning system would be with just satellites. And until we know that, then I think we ought to move with some reservation about abolishing the reconaissance squadrons.

Senator BENTSEN. Well, I'm deeply concerned, representing a state that has been subjected to the kind of devastation it has—I could go through the whole list of hurricanes that I've experienced there.

I might say, you were talking about the damage on the Coast, I recall that before Carla, I went down to rescue a little outboard motorboat I had, some 15 feet, and took my son with me. And we evaded all the police blockades and got down to the coast, and found that 15 foot outboard, and hauled it on a trailer back to town from my little cottage on the beach; put it by my house in Houston up against a brick wall. Really thought it was quite secure.

Three o'clock in the morning, I heard a tremendous crash. Went outside, and a pine tree 40 feet up had split, jumped over the wall, and went right through the center of my motorboat.

So you can't always predict these bloody things.

Well, I have a deep concern about the reduction of flights, frankly.

Dr. FRANK. Yes, sir. I share that concern.

The CHAIRMAN. Senator Gore?

Senator GORE. Thank you very much, Mr. Chairman.

Dr. Frank, congratulations on your 30 years of service to your country, which will be concluded this spring, if I'm not mistaken.

I'm sure that's been commented on before. But I wish you well, along with so many others who have come to trust your judgment and get reassurance from you during the midst of these hurricanes.

I just have a couple of brief questions on a subject that is related to this, but I won't spend much time on it.

I've been concerned and active on the issue of the greenhouse effect for quite some time. Isn't it true that the damage which America can expect from hurricanes will increase with higher sea levels?

Dr. FRANK. Yes, sir. Absolutely. The greenhouse effect, or whatever we want to call it, the melting of the polar cap, whatever is causing that, is causing sea level to rise.

And over the last century, sea level has risen, as you know, by about a foot. Now, that doesn't sound like a big impact, until you follow up and say, yeah, but these little islands out there will move anywhere from a half mile to a mile for every one foot change in sea level.

And I can take you along the coast line today and show you lighthouses that were built on islands in the 1840s that are now a mile offshore, and the island has moved away.

And that's what's happening along many of our islands; the islands are trying to move. And the hurricane is one process that causes that movement. The hurricane moves into the island, takes the sand from the front side, and deposits it on the back side. And there's a net movement of the island.

And the only problem now is, we've got that front side anchored with condos.

Senator GORE. Well, now, the damage being done to the coastline itself, obviously, increases dramatically with each centimeter rise in sea level.

And some have predicted a rise of one to eight feet in the next hundred years. Coastal cities would face disastrous consequences from that rise, which would be accentuated by periodic hurricanes, correct?

Dr. FRANK. Absolutely. And there are scientists who are advocating a strategic retreat from the beach. And I know Senator Hollings had suggested, well, you just can't leave that condo out there.

But there are some people who say, maybe that would be the least expensive thing to do. Even though that's an expensive building, let it go, and then rebuild back further inland to take into account this rise in sea level.

Senator GORE. Well, I have advocated a somewhat different approach to it. I think that ultimately the least cost of response is going to be to try to stop the collective global behavior which is producing the greenhouse effect.

We've already locked in a certain amount of temperature increase, and a certain amount of sea level rise. But the majority of what could occur is still preventable if we take some steps, some of which are currently outside the range of the possible.

But if we deal with chlorofluorocarbons, for example, in a speedy manner. If we deal with the problem of deforestation and accentuate our efforts on energy conservation, then perhaps we can gain confidence that the follow up steps might also be possible, and

might be brought within the range of what we currently believe is possible.

Is it also true that the greenhouse effect, by contributing additional energy to the troposphere, might increase the number and frequency of hurricanes?

Dr. FRANK. Well, if we have a general rise in temperature across the whole globe, I'm not sure it really would. If somehow some of that energy was concentrated in the tropics, it could.

You see, the hurricane is one way of releasing heat from the tropics. And whenever that hurricane forms, it takes a large amount of heat into higher latitudes.

So if somehow that heating would be more manifested in the tropics, yes, it could.

Senator GORE. Well, I'll pursue it in other forum, but just in conclusion, am I correct in saying that in a broad sense the world weather system is an engine for transferring heat and cold back and forth between the equator and the poles, as well transferring motion from the sea to land and back again.

Dr. FRANK. Absolutely.

Senator GORE. And if the greenhouse effect does what scientists now unanimously say it will, that is, increase the temperature in a differential way, with a greater increase at the poles than at the equator, then that will create changes in the world weather system that are difficult to predict at this point.

And it could have an impact on the number and frequency of hurricanes?

Dr. FRANK. Yes, sir.

Senator GORE. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

Dr. Frank, finally, let me ask about a different way of going about what we both would think is a proper approach of trying to make sure that we don't assume—my good colleague from Nebraska is worried about hurricanes, and of course, I'm worried about those building in the flood plains and having to pay for the droughts and the tornadoes. We've been paying for those for years. And it has now, with this wonderful television, come to the public mind. Good gosh, when that hurricane hits us down there with all those sea walls built right there in the ocean, the taxpayers are going to pick up the bill.

I'm going to run over to the President. He's going to declare it a disaster area. And we're going to start giving Federal aid, funds, and everything else of that kind.

I remember building; I am confident that it was necessary to elevate my house 19 feet in order to get flood insurance. Is that the wrong approach? Because I can build 19 feet out in the ocean, or 20 feet, trying to talk in the extreme.

Could it be, like you say, an offset from mean high tide, and just not have flood insurance for anything build in that particular area?

You know, if they want to build, and build with their own money. But once you put that flood insurance restriction, they can't get financing. Insurance companies are not going to insure.

And then any fool who wants to build out there in the water, let him go ahead and build out there in the water.

I think maybe the height approach hasn't worked. Maybe it should be an offset from mean high tide, like you're talking about right now.

Given all those pictures, if they were built back. Maybe they'd still want to build out in the ocean. I mean, people are building in the ocean, and fine business. But just don't you and I pick up the bill for it. Isn't that what we're saying?

Dr. FRANK. That's what we're saying, yes, sir. And let me comment on that height. See, the heights that we're required to build at is the levels that we would expect to be flooded every hundreds of years.

All right, now that's an economic decision. We could have made the decision to make that 75. Or we could have made the decision to make that 200.

It probably doesn't make sense to build a building out there that could survive the worst hurricane that we could ever have, although that's feasible.

So when we said the 100 years, that's strictly an economic consideration. And so when you go into building codes, setbacks and those kind of things, that's all an economic study. And you've got to determine, a society has to determine, what kind of risks they're willing to take.

The CHAIRMAN. It's the economic pressure. Some in the audience just wouldn't understand. But like I say, I'm from the coast, and my lot was $80,000. And I thought that was, gracious, plenty to pay. And right in front of me, on the righthand side, some fool from Ohio came and bought a lot for $495,000, a smaller lot than mine.

Dr. FRANK. I understand you. There are a lot of economic pressures down there.

The CHAIRMAN. Just for a sandlot. I mean, the entire island was bought for $45,000, not long ago. About 50 years ago. The entire island. And now they're selling lots there for $495,000. And down at Hilton Head, they're even more expensive.

Senator GORE. Have you sold yours yet?

The CHAIRMAN. No, I'm going to sit right there. Because it's like Washington, where do you go if you sell it? You can sell for a good price in Washington, and then you're caught. You can't buy anything.

But we do appreciate your appearance here. And thanks for the magnificent job that you've done.

Dr. FRANK. Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF DR. NEIL FRANK, DIRECTOR, NATIONAL HURRICANE CENTER, NATIONAL WEATHER SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. Chairman and Members of the Committee, hurricanes are not freak accidents of nature that were created to cause death and destruction. Quite the opposite—hurricanes perform a very important function in the atmosphere. Because of the way the sun shines upon the globe, we receive too much heat in the tropics and a deficit of heat in the polar regions. This is especially true in the summer. In order for life to be tolerable on this planet, there must be ways of mixing the cold and warm air. During the summer, nature has a very effective way of accomplishing this mixing and it is called the hurricane. When the tropical atmosphere boils, a hurricane

forms and when the hurricane moves into higher latitudes, heat is removed from the tropics.

If man would learn to live in harmony with nature, we could minimize our problems. If one builds a house on a small island along the gulf coast, one should not complain about hurricanes; but, so be it, we have decided to do so in this Nation and we now have a serious hurricane problem.

We are more vulnerable to hurricanes in the United States now than we have ever been in our history. Millions of people have been attracted to our beautiful coasts, exposing a large population to the threat from hurricanes. The primary concern is that residents of coastal areas that are vulnerable to flooding from a hurricane's storm surge may not have enough time to evacuate. In certain locations and meteorological circumstances, an evacuation cannot be completed within the warning time that huricane forecasters can realistically provide.

During the past decade a number of comprehensive evacuation studies have been completed and the results are alarming. It would take 20 to 30 hours to evacuate some of the most hurricane-prone locations, including the Galveston Bay area, Tampa Bay area, the southwest Florida coast, the Florida Keys, and the southeast Florida coast. Evaucation times for Corpus Christi, Texas, Beaumont, Texas and Charleston, South Carolina, approach 15 hours. We do not know the time required to evacuate our most vulnerable city, New Orleans, nor the coastal islands of New Jersey, a mecca for hundreds of thousands of summertime vacationers. Studies of these areas have yet to be completed, but it is estimated that their evacuation times are similar to that for the Galveston Bay area.

Traditionally, the goal of the National Hurricane Center has been to provide 12 hours of daylight warning time for evacuation. Obviously, the time required to evacuate many coastal areas far exceeds the lead time of our warnings. The technologies of the 1990's, NEXRAD, AWIPS and GOES–NEXT, will enhance our ability to observe and analyze the detailed hurricane structure. These technologies and the resulting better warnings will improve our abilities to forecast hurricane damage in the near-timeframe. Even here, however, if we attempt to provide the longer warning lead times that are compatible with evacuation studies, excessive evacuations will occur because of deficiencies in hurricane forecasting skills for these extended periods. Consider the problem that arises when an intense hurricane threatens an area that requires 24 hours to evacuate. If a perfect forecast could be made, the length of the coastal region that required evacuation would normally be less than 100 miles. However, the mean error in predicting the position of a hurricane 23 hours in advance is slightly more than 100 miles. To provide for this uncertainty in the forecast track, approximately 300 miles of coast would have to be evacuated. Consequently, two-thirds of those who evacuated would have done so unnecessarily. Stated another way—for every three times evacuation is advised, only once will it prove necessary. This raises the issue of credibility. How many times will people evacuate unnecessarily before they lose faith in the warnings and ignore the advice to evacuate?

The hurricane warning problem is compounded by two serious misconceptions. First, coastal residents find it difficult to believe that evacuation times are as great as indicated by comprehensive studies. According to a survey of 300 coastal residents, which was conducted a few years ago, most people believe that 1½ hours would be sufficient to evacuate the Sarasota, Florida coastal area. In reality, detailed analysis reveals that it would take 16 hours to move threatened residents to safety.

The second prevailing misconception is that forecasts are much more accurate than they are. This misconception is being inadvertently fostered, in part, by the impressive display of weather information shown daily on television. Viewers are dazzled by color animations of satellite and radar images that are accompanied by computer-generated weather maps marching across their screens. There is a perception that technology has resulted in much more accurate forecasts today than those of a decade or two ago. In fact, the atmosphere is observed in much greater detail than ever before, and computers produce more accurate descriptions of certain atmospheric features. However, the improvement in hurricane forecasts falls far short of the public's perception.

Occasionally a hurricane will behave in such an anomalous and unexpected way as to preclude the issuance of warnings in sufficient time to complete evacuation. Hurricane Alicia in 1983 had the potential to produce a catastrophe. It formed as a weak storm in the Gulf of Mexico in an environment that did not appear favorable for strengthening. Local officials in Galveston decided against complete evacuation of coastal areas. When Alicia strengthened significantly, in the 18 hours before landfall, it was too late to totally evacuate the threatened area. Large loss of life

was averted by the presence of a 15-foot seawall that was built to protect the city following the record hurricane disaster of 1900 that claimed 6,000 lives. Few coastal locations have such massive seawalls. If a similar situation occurs in a unprotected area, resulting casualties could number in the hundreds of thousands.

Unanticipated acceleration of a hurricane causes similar warning problems. In 1938, a major hurricane was just east of the Bahamas. In just 30 hours, it accelerated northward and crossed Long Island, New York, at a speed approaching 60 mph. Hurricane Hazel struck North Carolina at 50 mph in 1954. Little warning preceded the arrival of these storms, and even today it might not be possible to provide more than 6 hours warning in similar circumstances.

The number of severe hurricanes that have affected the United States during the past few decades has been below average. Ironically, this fortunate anomaly only adds to the current warning problem. Fewer hurricanes crossed our coastlines during the 1970's than during any other decade of this century. Until Hurricane Gloria, 1985, it had been nearly a quarter of a century since the last major hurricane struck the east coast of the United States and more than 35 years have passed since the Florida peninsula was hit by a devastating storm. Studies prior to 1985 show that more than 80 percent of the 40 million residents of counties bordering the Atlantic Ocean and Gulf of Mexico had never experienced a major hurricane.

There is an urgent need in this Nation to renew our efforts in dealing with the hurricane problem. Coordinated action by local, state and appropriate Federal agencies should be undertaken and should include the following goals:

(1) Completion of comprehensive evacuation studies for the entire coastline to determine the magnitude of the U.S. hurricane problem.

(2) Development, by coastal communities, of emergency procedures to be initiated when a meterological surprise does not permit adequate lead time for horizontal evacuation. Vertical evacuation (moving to the upper floors of multi-story substantial buildings) is one such concept. Even though it was introduced nearly 15 years ago, vertical evacuation has not been thoroughly evaluated. Consequently, not one community has chosen to adopt this as part of its procedures.

(3) Develop coastal strategies that will minimize hurricane damage to structures, including a review of building codes and appropriate set backs.

(4) Development of forecast techniques that will allow the public and government officials to give proper consideration to the uncertainties in the hurricane warnings when making "action" decisions.

(5) Development of hurricane education programs that inform people of their dangers and dispel misconceptions.

This statement is not intended to be an argument for or against coastal development. It is a plea for responsible planning for the protection of the lives and property of U.S. citizens. If, as a Nation, we do not move foward quickly in seeking solutions to the hurricane problem, we will pay a severe price. The price may be thousands of lives. As you continue your deliberations, I trust you will give highest priority to a most important coastal resource—the human being.

The CHAIRMAN. Now we have Mayor Ficken, former Mayor of Myrtle Beach, SC, where millions visit. Mayor Ficken has been head of our council of mayors, and has done an outstanding job, and knows the problem we're talking about.

We welcome you to the committee, and we'll be glad to hear from you at this time.

STATEMENT OF ERICK FICKEN, FORMER MAYOR OF MYRTLE BEACH, SC

Mr. FICKEN. Thank you, Mr. Chairman and Members of the Committee.

I appreciate the opportunity to come before you today and speak to you on matters of interest to the coastal zone management.

My background is as mayor of the City of Myrtle Beach from 1978 through 1985, and currently serving as the chairman of the South Carolina blue ribbon committee on shorefront management which was appointed by the State Coastal Council to make recommendations to the State of South Carolina General Assembly re-

garding stronger enforcement laws regarding our coastal management zone.

Some of the things that you've just been talking about with Dr. Neil Frank are some of the things we've been working on: setback lines and construction codes.

I want to speak for just a few minutes about the pressures that affect local government, if we can bring this back down from the troposphere back down to the local governmental entity, which is really where it's happening.

The people that are faced with it on a day-to-day basis are the elected officials in your local governments, both cities and counties, in the coastal regions of our country. And the pressures affecting these folks are tremendous.

As you mentioned, the economic pressures, people owning valuable pieces of property on the ocean front can put tremendous pressure on elected officials to prevent them from doing some of the things that might be in the best interest of the citizens as a whole.

In Myrtle Beach we have a shoreline within the city limits of about 13 miles, and we have experienced erosion during the past seven or eight years, and began looking at that as to how we should deal with it.

And a good portion of it was brought about by the growth and the increasing construction on the ocean front, and there were no setback restrictions. An individual who desired to build and who owned an ocean front lot could build just about as close to the ocean as he wanted to go until the coastal council became involved in 1978 and began putting restrictions at what they call a critical line, which is determined as the base of the primary dune line on the landward side.

In other words, if you come across the dune, they would draw a line along the trough of the primary dune line, and anything forward of that would require a permit. Other than that, you could do anything you want to. Which means you could build right up against that primary dune, and a lot of time, the mean high water mark is only three or four feet on the other side of that dune line.

So with the kinds of tides and storm events that we have with hurricanes, or a gale storm like we had on January 1st, you can receive tremendous damage. The dune protection is removed. Walls are applied for and put in place. And erosion is exacerbated as Dr. Frank mentioned. And the problem just continues to worsen.

There are so many pressures affected by growth on local governments, providing the normal delivery services of a city. For example, the City of Myrtle Beach is a city of less than 25,000 people, but about six months out of the year, it's the largest city in the State of South Carolina, with over 250,000 to 300,000 people residing in it.

That swell in population presents tremendous problems in providing adequate public safety and police and fire protection; sanitation; and water and sewer infrastructure delivery systems.

During my term as mayor, we spent in excess of $50 million in our little city just on water and sewer improvements. Most of those local funds—Federal funds kind of disappeared along the way—most of that was local dollars.

We've spent a lot of money in trying to improve the normal delivery services to take care of the influx of tourists. We'll have 12 million visitors pass through Myrtle Beach this year. Large numbers of visitors from Ohio and Virginia and Pennsylvania and New York and the Eastern Seaboard.

And in fact, next week, our Canadian American Days Festival will begin, and we'll have 75,000 to 100,000 Canadians in our city next week.

It's a tremendous recreational area, an attractive recreational area, that provides tremendous support to the state's economy. Tourism in the state of South Carolina was just recently determined last year to be a $3.75 billion industry, and two-thirds of that industry is generated in the coastal counties of South Carolina.

So economically, it's vitally important that we maintain our beaches.

It's difficult for local governments to deal with that. They do not have the expertise to make things happen when it comes to managing beach dune systems and protecting against that.

We found that out in this recent committee work that we've just completed our report on in the shorefront management committee for the Coastal Council. And we will be recommending, the committee report will recommend to the State of South Carolina, a gradual 30-year retreat from the primary dune line, based on historic erosion rates.

And we will also be encouraging the use of nourishment as a means of stabilizing and revegetating our coastal protection, which is the primary dune line, and the beach dune system.

In my experience, in the City of Myrtle Beach, and from the reports we've heard on the shorefront management committee, it's without question the continued proliferation of hard structures, sea walls, revetments, other types of hard structures on our beaches will assure the destruction of our beach over a period of time.

The nourishment or other soft measures in protecting and preserving and enhancing our beach dune system is the only viable means of maintaining our coast line and providing for a continued existence of our significant economy that's reflected on that particular area.

There are a lot of areas that we've touched on, and I'd be glad to address any of those. I would urge your continued support for a national coastal zone program that would work with state governments that would allow the support to be lent to local governments to accomplish the preservation of our beaches.

The CHAIRMAN. Well, I'm impressed with your experience and knowledge.

Let me ask you this, Mayor Ficken, with respect to your expertise. We were saying our local government is the best place for decision making, and we can't zone things from Washington. Yet we have a national problem.

I think your Myrtle Beach has grown by 1500 percent since the end of World War II or more.

I used to work as a lifeguard out there before the war and everything else. So I know. From Patricia Manor down to the Ocean Fires Hotel there wasn't a single home.

Now, it's overgrown. We thought we were giving you the local government, the authority. I mean, we wanted those interested to come together, and not only have them come together, but even the Feds having to respond to it with the Federal consistency provision.

So once a state passed a coastal zone management plan, instituted its council and passed its plan and it was approved at the Federal level, thereafter, it would then bring about a comprehensive kind of authority, not necessarily expertise or anything.

But you do feel like there's anything lacking in the authority from the Federal end?

Mr. FICKEN. Senator, there's several things I'd like to touch on based on those comments.

First of all, I think that's right. I think the local government has the authority. And can act with authority in conjunction with the Coastal Council in the State of South Carolina.

The resources that are available in terms of funding to accomplish these things is what's missing. Our blue ribbon committee is recommending a local—recommending that each local government establish a local, comprehensive beach management plan.

And the reality is that if we include funding legislation with that, that we'll not get the beach dune system management plan through the State General Assembly.

So they have to ride separately. But funding is necessary to accomplish it.

Myrtle Beach imposed a setback line on its own, the City Council. We imposed a setback line based on a 50-year historic erosion rate.

The CHAIRMAN. When did we do that?

Mr. FICKEN. Two years ago. That may be the reason I'm not Mayor anymore.

We did do that. And I think we are the first city, the only city at that time, to have a setback line in the State of South Carolina.

The CHAIRMAN. How's it working?

Mr. FICKEN. It's working fine. It's a little too soon to tell what the long range benefit is, because it only affects new construction from the date it was passed.

In conjunction with that, Senator, and imposing a setback line that would essentially take a portion of useable property from those ocean front property owners, we committed to doing a renourishment program, a $4.5 million renourishment program, placing a million cubic yards of sand on the beach, in order to restore and preserve the dry sand recreational beach in front of these properties.

On the storm event of January 1st we lost a lot of property, a lot of sand. The damage along the grand strand was estimated at $20 million, that's to structures, on a storm event that had winds measured at only 40 to 50 miles an hour, not near hurricane force.

Those areas that were renourished within the City of Myrtle Beach received no property damage. The renourishment held up well. It saved untold millions of dollars in property damage.

Those areas that were not renourished within our city lost 30 and 40 feet of dunes and property, and came very near to some structures.

We were fortunate. The question for the City of Myrtle Beach, which is better able to pay for renourishment than probably any other city on the coast of South Carolina, through the use of its accommodation tax, is, can we afford it?

Certainly, if it's a question for Myrtle Beach, it's a more significant question for smaller communities.

We bonded our accommodations tax money to the tune of $750,000 a year for 10 years to pay for that $4.5 million project.

The CHAIRMAN. It doesn't wash away with that big flood tide you had in January?

Mr. FICKEN. We lost some of the sand, no doubt. It's in the system, according to the experts. We've increased our sand budget, and it's in the system. And as time goes on, and the winds blow, it may come back to shore. But it prevented millions of dollars of damage.

The question becomes: Can you afford it? Ten years from now, with a series of storms, increasing sea level, and all the sands washed away, will there be an ability to go back and try nourishment again.

But the question for smaller communities that don't have an accommodations tax revenue that's generating a significant amount of dollars to pay for renourishment, take a Folly Beach or take a Fripp Island or some of the barrier islands—and I might mention that Myrtle Beach is a little different because it doesn't act like a barrier island on the coast of South Carolina; it's more of a mainland type beach—those area provide a tremendous support to the tourist industry, to the day visitor, to the recreational visitor, but they don't have the revenues to make any meaningful impact on preserving their beaches.

The CHAIRMAN. I went to Toronto back in 1959 I guess it was. And you start Canadian days?

Mr. FICKEN. Next week.

The CHAIRMAN. How many Canadians will be down there?

Mr. FICKEN. I expect we'll have close to 100,000 Canadians in town next week.

The CHAIRMAN. Senator Gore?

Senator GORE. Thank you very much, Mr. Chairman.

My family and I have for years gone down to Myrtle Beach and Pawley's Island. And my children make sure that we spend most of our money at Myrtle Beach because of the attractions there.

And I congratulate you on your testimony. I found it very informative.

I was looking at this article from the *Coastal Zone Management Journal* which describes the conference that the EPA had in 1983 on sea level rise.

And one of the studies they looked at involved Charleston, SC.

I'm wondering if as a former local official you have been made aware of what the scientific community now expects in the way of sea level rise from the greenhouse effect?

Mr. FICKEN. Yes, we have been very familiar with the reports, earlier report, from Dr. Pilkey. And we started listening to him back in 1978 and 1979, and Mr. Titus' more recent report on the effects of sea level rise.

And our shorefront management committee spent a great deal of time giving consideration to the effects of that and trying to make that a focal point of our report.

That fact alone, sea level rise, makes it almost mandatory that somebody take a position that construction be moved back landward from the existing dune lines as we know them today.

Senator GORE. Well, in your statement you say, and I quote: In the long term sea level rise will undoubtedly nullify all of man's best efforts to defy the encroaching ocean.

And immediately after that you talk about the 30-year retreat from the eroding shoreline.

Is the anticipated rise in sea level from the greenhouse effect one of the reasons for the 30-year retreat? Or is that based solely on the current situation?

Mr. FICKEN. No, I think the anticipated sea level rise is one of the reasons for that. I think that if sea level does rise to the one to two to three feet over this extended period of time that we're talking about, obviously, we're going to see some excessive erosion.

That 30-year retreat is based on average annual erosion rates over the past 30 years projected over the next 30 years. So an area that's been eroding historically at two to three feet a year would have a significantly wider setback than an area like Myrtle Beach that has an historic erosion rate over the past 50 years of less than one foot.

Senator GORE. To what extent do you attribute the erosion of the last 30 years to what Dr. Frank said had been a one foot rise in sea level during this century?

Mr. FICKEN. Well, from the so-called experts in that field, there are several different suggestions as to the reason for the increased erosion, reaching from not having significant storms off the West Coast of Africa, southerly storms that would bring the sand back onshore, and allowing a continuous stream of northeasters to carry more sand away, without the compensating sand coming back.

There's some suggestion that the continued use of the aquifer, the subsurface water used as potable water, is relieving the pressure on the upper stratas which is allowing that to sink ever so slightly.

But a combination of storms, I think, with the increased proliferation of hard structures being placed on our beaches to try to hold it back is what continues to make the problem greater.

Senator GORE. Did you happen to see the cover in *Discover* magazine on the relationship between the greenhouse effect and the erosion of beaches throughout the United States.

Mr. FICKEN. I don't think I saw that particular issue.

Senator GORE. I may provide that for the record of this hearing. But a lot of local officials around the country are now looking very closely at what the longer term consequences are going to be if this greenhouse effect continues.

Thank you, Mr. Chairman.

Mr. FICKEN. I think, Mr. Chairman, it is important to point out that even Dr. Pilkey, the leader of the abandonment idea, has said that in the case of Myrtle Beach it is economically feasible to attempt to maintain the recreational dry sand beaches.

We're developed to an extent that it's such a vital part of the economy, not only of the local governments but of the state government, that it's economically feasible to attempt those known activities that will assist in maintaining the recreational high tide beach.

The CHAIRMAN. Good. Senator Stevens?

Senator STEVENS. Thank you, Mr. Chairman. I might say to my colleagues, we had the opening hearing on the 1990 census. That's something you're going to have to get your heads into.

The CHAIRMAN. We had the Secretary of Commerce the other day at your subcommittee on the 1990 census.

Senator STEVENS. Well, the cost of that census is going to double compared to 1980, and it's going to absorb a lot of programs in the Department of Commerce if we're not careful.

I would like to congratulate the Chairman for starting right off with some hearings on coastal zone management.

I have no questions for this witness. I would call to everyone's attention, though, that I have raised concerns about the consistency provision.

I understand that we will get to that later, in comments from other witnesses, and so I will wait until that time.

The CHAIRMAN. Very good. Senator Breaux?

Senator BREAUX. I sure hope that Alaska will still be a state after the 1990 census. There's no planned changes in that area, is there?

Senator STEVENS. They try out the forms in Alaska because of our diverse population. And I think if they do it again like they did in 1980, we'll ask to secede.

Senator BREAUX. Thank you very much, Mr. Chairman.

I really want to commend the Chairman for his leadership in his role in scheduling this hearing this morning.

I think this is really the first time that this Committee, or Congress in general, has had an opportunity to look at the Coastal Zone Management Act as it deals with wetland losses.

I remember quite well in 1972 and 1973 when the Chairman was in the leadership role on this side, and many of us on the House side were involved in developing the legislation.

Mr. Ficken, I apologize for not being here for your opening comments. I wasn't too sure where you were from, but I started detecting the fact that you might be from the same state as our distinguished Chairman by that accent.

So we welcome you, and I appreciate your testimony.

We're going to talk about erosion, Mr. Chairman. I want to offer the committee an opportunity to come and really see what erosion is all about in the State of Louisiana.

But we're going to have to do it before the whole state erodes away.

We've got 40 percent of the wetlands of all of North America. And yet we are losing 55 square miles a year.

So when some states speak in terms of a foot here or a foot there the real problem that we have in Louisiana is magnified many, many times over some of the other problems.

And it's a national problem. Our state drains two-thirds of all of North America, drains their waters through Louisiana through the Mississippi.

And as a result, we've had to build levies so New Orleans isn't flooded and Baton Rouge isn't flooded. But in doing that, we've contributed to the wetland loss, because no more does the river flood over and renourish itself and rebuild itself.

We've tried a lot of things. We in the House authored the Coastal Barrier Act last year—two years ago. And followed up in the Senate over here, which prevents development on the barrier islands. And that's going to be helpful.

But it's a national problem. And I would hope that our committee would have the opportunity to consider legislation.

We had introduced a bill last year in the House which I've reintroduced in the Senate which is entitled The Coastal Wetlands Act of the United States which, for the first time, would put the Corps of Engineers, which is the construction arm of the government, in the business of coming up with some specific programs to help alleviate the problems.

And they would do it in cooperation with EPA, and with the National Marine Fisheries Service, and with the Fish and Wildlife Service, and with the respective states.

It would require them to identify the 10 most seriously impacted areas in the United States, and then to come up, within 24 months, with a plan to take action to stop that erosion.

It would be the first time that this government would recognize that it's a national problem. And a single state like South Carolina or like Louisiana or like Massachusetts or California, cannot do it by ourselves.

And I think that the priority of intent in this legislation would be what I think is needed.

I don't have any questions, Mr. Ficken, other than to thank you for being here and for your wise observations.

And thank the Chairman for his leadership in this area.

The CHAIRMAN. Well, I thank you, Senator.

Mayor Ficken, the blue ribbon committee, what is your experience with respect to trying to move this along?

I know all the developers down there said, no, you're not going to take my very valuable front beach lot and make it worthless administratively or politically overnight.

And yet we've got to be moving. Is it better rather than having a height requirement in flood insurance requirements, to have an offset back behind that dune line? Or what, from your study on that blue ribbon committee that you're heading up, what would you recommend?

Mr. FICKEN. I think probably a combination thereof, a combination program that recognizes that the construction restrictions placed in the flood zone, but a restriction to require structures to be moved a little—we're not talking about moving back to Charleston from Folly Beach. We're just talking about moving 30 or 40 or 50 feet, which in the whole scheme of things, is not a great move.

But for those individual property owners, it becomes a question of removing a significant portion of their useable property.

So I think a combination of a setback from the primary dune line; some construction building codes, which our committee looked at and decided that it was more than we could tackle and more than we were charged with, but something that was vitally necessary; coupled with funding available for beach nourishment and maintenance.

I think that's absolutely vital in numbers of cases. And I think we can maintain a beach dune vegetation system that will assure the long term viability of our beaches in South Carolina, and I'm sure in other areas of our country, based on a combination of those effects.

But that's not necessary going to take a mandate from the Federal Government, but instead, strong cooperation between the Federal Government and the state agencies responsible for making those things happen in their particular areas, and working with local governments.

The CHAIRMAN. Very good. I'm on that highway bill conference. And the conferees have agreed to put in that interconnector from Florence and Myrtle Beach down to Highway 17. And we've actually put funds, as you know, $32 million. That will bring more than the 12 million visitors.

Mr. FICKEN. That's exactly right. Mr. Chairman, I couldn't help but think while Dr. Frank was talking about the evacuation process, it's equally important to have that connector in the event of an emergency to get people out of there as it is to get them in there. And I thank you.

The CHAIRMAN. Exactly. We commend you for your appearance here today. We appreciate it very much.

Mr. FICKEN. Thank you, it was my pleasure.

The CHAIRMAN. Thank you.

[The statement follows:]

STATEMENT OF ERICK B. FICKEN, MYRTLE BEACH, SOUTH CAROLINA

My name is Erick B. Ficken from Myrtle Beach, South Carolina. My background includes service as Mayor of the City of Myrtle Beach for eight years, ending in 1986, with two years prior service as a City Councilman. As you probably know, Myrtle Beach is one of the most popular tourism destinations on the Atlantic Coast. Presently I am serving as Chairman of the S.C. Water Resources Commission which is the water resources planning agency for the State of South Carolina. I am also now serving as Chairman of the South Carolina Blue Ribbon Committee on Shorefront Management which was appointed in 1986 to recommend to the S.C. General Assembly improvements in the State's Coastal Management laws. As you can see, I speak with experience in regard to natural resources management, local government and the role and problems of local governments, and specifically, with experience in coastal zone management and planning.

It is a pleasure to be able to come before you today to speak on the matter of coastal zone management and I very much appreciate the opportunity to do so. My comments to you will be directed to the problems local governments face in coastal management and to the importance of the National and State Coastal Zone Management Programs in assisting local governments in meeting these challenges.

As a former Mayor of the City of Myrtle Beach, I have witnessed firsthand the tremendous growth which has taken place and is continuing in our coastal areas. This growth in tourism and in permanent residents places a tremendous burden on public infrastructure, governmental services and the environment. Local governments are not generally in a position to effectively manage the impacts of this growth nor do they have the capability to plan for continued growth so as to avoid the host of problems which many coastal communities are now facing.

In Myrtle Beach, South Carolina, the problems I confronted as mayor were largely attributable to the rapid growth in our coastal tourism industry. Without ques-

tion, tourism growth has brought with it unprecedented economic growth and benefits. However, this growth has been so rapid as to defy effective management due to modest local planning ability through much of the period of the 1970's and early 1980's. This problem is compounded and perhaps even overshadowed by the dynamic and unpredictable nature of the ocean and shoreline. Through not knowing any better and through not having experienced any significant coastal storms since the 1950's, high density development with high rise hotels and condominiums was allowed to be constructed in very close proximity to the shoreline. The shoreline has also eroded landward in much of this area to the alarm of all concerned.

The South Carolina Coastal Council came to the assistance of the City of Myrtle Beach in 1983 with the technical and planning expertise to assist the community in developing a long-term solution to the problems of shoreline erosion and uncontrolled high density shoreline growth. Following a series of technical studies and investigations, the City of Myrtle Beach and the S.C. Coastal Council developed a comprehensive shorefont management plan based upon a regional setback from the dynamic 30-year erosion zone and renourishment of the eroded beach as a means of reestablishing the public recreational beach and providing a storm protection barrier for shoreline property.

The State Coastal Management Program in South Carolina has assisted other communities and county government in similar fashion. Such comprehensive shorefront management plans have been developed for the Town of Hilton Head Island, and for the remainder of the 65 mile Grand Strand region of Horry and Georgetown counties. Effective coastal zone management requires the full knowledge of the respect for coastal processes. It involves the establishment of a management program which together with local governments can plan for sound growth and problem avoidance while confronting current issues and problems. Thirdly, it must include the ability to enforce applicable policies and regulations. Our state program processes all of the above and is judged at the national level as one of the stronger coastal management programs. My testimony today could have been given by any one of a number of coastal mayors, county officials or public administrators in South Carolina who have been well served by the S.C. Coastal Council and its staff in providing for coastal planning, management, enforcement and other forms of local assistance where this capability has been unavailable at the local level.

I am providing these remarks to you not to sing the praises of the S.C. Coastal Council, per se, but to commend, recognize, support in any way I can the value of an effective state role in coastal zone management. Where that role emphasizes a high degree of cooperation and communication between state and local counterparts, this value is all the more important.

The real strength of the National Coastal Zone Management Program in my view is in the all important state role which at the present involves 29 coastal and Great Lakes states with 92 percent of the nation's shoreline. Through this participation, continuity and consistency are created along common shorelines. The states as a group can effectively shape national coastal zone policies from the perspective of first-line managers, experienced in the complexities of coastal resources issues. Much of this state experience and capability has been developed through the support funding provided by the Office of Coastal Resources Management within NOAA. In my view, this support should be continued. Our coastal resources are, more than any other natural resources to be enjoyed by the citizens of this nation as a whole. The continued well-being of the coastal zone, and what it means to the economy and the environment, should be a priority national objective.

My service as Chairman of the South Carolina Blue Ribbon Committee on Shorefront Management has given me additional insight into the problems and issues of coastal zone management. I have been fortunate to be able to work with this Committee to provide a blueprint for state/local cooperation in an even stronger management program for our State's shoreline. This task has included indepth examination and review of similar strong programs in the states of North Carolina and Florida which both participate in and receive support from the National Coastal Zone Management Program of OCRM. This review has heightened by appreciation for the state role and allowed me to see a clear commonality among effective state programs. First and foremost, accurate technical data is necessary to pursue sound management and planning with data on such variables as erosion rates, sediment budgets, storm vulnerability and accurate assessements of the impacts of alternative decisions. Secondly, effective state programs provide for strong enforcement of governing policies and controls with the deciding criteria being compliance with public interest objectives and goals. The final important component of an effective state program is public support and participation and a close cooperative relationship with local governments. Communities alone cannot provide for these necessary func-

tions. The states assistance grant program from OCRM has allowed participating states to build effective coastal zone management programs, suited to the needs and demands of each individual state, and consistent with certain national objectives and purposes for coastal zone protection, enhancement and development as contained in the National Coastal Zone Management Act.

As I stated before, and as I am sure you are all very aware, the shorelines of our Nation are dynamic and everchanging. Engineers may be able to prevail for a period of time in stabilizing the shoreline, but only until erosion control structure fail and are either replaced by more substantial structures or the area is abandoned through retreat. In the long-term, sea-level rise will undoubtedly nullify all of man's best efforts to defy the encroaching ocean. The S.C. Blue Ribbon Committee on Shorefront Management has recognized this expectation and has recommended a long-term 30 year retreat from the eroding shoreline. However difficult to follow, I view this conclusion as both realistic and necessary.

Other states have reached this same conclusion. Local governments will be particularly pressured by the implementation of this policy. State planning and management assistance will be necessary to assist communities in this major task.

I envision very serious problems for this Nation's coastal states and cities if appropriate steps are not taken now to plan for and anticipate sea-level rise and storm vulnerability. The ever increasing population densities in the coastal zone only serve to increase the potential for disastrous sequences. Effective national, state and local coastal management are needed now more than ever before. A community such as the City of Myrtle Beach, no matter how determined and publicly supported, cannot effectively follow this necessary course of action alone.

Thank you again for the opportunity to speak to you today on this very important matter. I urge your consideration of and support for the National Coastal Zone Program and its support to the states.

The CHAIRMAN. Next we have Dr. Don Boesch, the Executive Director of the LSU Marine Consortium, in Chauvin, Louisiana, which is yet to wash away.

Senator BREAUX. He has to get back this afternoon to make sure it's still there.

The CHAIRMAN. Well, we welcome you, Dr. Boesch, and we will include your statement.

STATEMENT OF DR. DONALD F. BOESCH, EXECUTIVE DIRECTOR, LOUISIANA UNIVERSITY MARINE CONSORTIUM

Dr. BOESCH. I will highlight it, Senator.

Senator Hollings, Members of the committee, I'm pleased to be here today to have the opportunity to discuss with you the status of our nation's coastal environment, and in particular, since I'm a scientist engaged in research and the application of research to management, the need to increase our understanding of this environment so we can preserve it and manage it more effectively.

The U.S. coastal environments are of inordinately great importance of this country. As the 1990 census will undoubtedly show, Senator Stevens, three-fourths of the population of the United States will at that time live within 50 miles of either the ocean coasts or the Great Lakes coast of this country.

This area is also an area of very rich resources, in terms of transportation, food, water, dilution of waste, recreation and aesthetics.

For example, 70 percent of our nation's commercial fisheries are dependent on the estuaries for part of their life cycle.

In sum, the coast and its resources are exceptionally important ingredients to the economic welfare and the quality of life of the American people.

The cumulative impacts of our use of this environment pose threats to these resources and the ecological systems which support them.

There's a widespread belief among the public, and I think there's also technical consensus and adequate documentation that, as a consequence, coastal environments are becoming increasingly and seriously degraded, and that the enormous value of their resources to our society is being jeopardized.

Two particularly difficult problems from my own immediate firsthand experience illustrate the enormity of the problem. First, as Senator Breaux indicated, we in Louisiana are losing 50 to 60 square miles of coastal wetlands per year as a result of activities done quite a long time ago in managing the Mississippi River for navigation and flood protection in the local and national interest, as well as in the extraction of oil and gas resources from our coastal and offshore waters.

Secondly, we have recently uncovered the occurrence of a biologically harmful depletion of oxygen in our very productive continental shelf waters which produce the nation's leading fishery resources, both in terms of value and tonnage.

Over 3,500 square miles of the bottom of the Gulf of Mexico during the summer basically goes dead because of the lack of oxygen.

We think this may be, although we do not yet know, related to an increase in the nutrient content from agricultural runoff and waste disposal in the vast Mississippi drainage basin.

Society's impacts on our coastal waters, ecosystems, and resources include toxic contamination; eutrophication, or nutrient enrichment, as I described earlier; contamination by human pathogens which interfere with harvesting of shellfish and provide health risks; loss of critical habitats to our fishery resources, both recreational as well as commercial fisheries; changes in those living resources themselves which we've seen here close by in Chesapeake Bay in other of our nation's important estuaries and coastal waters; and also, quite fundamentally, changes in the input of fresh waters, as a result of the use of those fresh waters in the inland areas.

In addition, as was mentioned earlier, we may be soon facing a rise in sea level around the world as a result of global climate changes, which threatens not only our habitation of the coastal environment, but the nature of those environments, and their productivity of the resources.

The declines in coastal environmental quality and resources have continued over recent decades, despite the existence of a variety of management programs created by Congress, created by state governments and local governments.

Although the damage would certainly be worse had these programs not been in place, the failure of these Federal, State, and local management programs and regulatory efforts to halt the serious degradation is a result of both the lack of understanding of what should be managed, and structural and operational shortcomings in these management programs.

Shortcomings in management programs have included: the lack of integrated planning; case by case decision making; inadequate

enforcement of compliance; failings in interagency communication and coordination; and insufficient technical basis for management.

Integrated planning is probably more achievable at a regional level or local level than the national level. Thus the coordinated regional approaches, such as the estuary management conferences called for under Section 320 of the Clean Water Act should be nurtured and carefully observed to evaluate their effectiveness.

Coordination over larger regions of the country, such as proposed in the EPA–NOAA Gulf Initiative, offers the opportunity to comparatively apply technically based criteria in the identification of priority areas; the efficiency of addressing local problems from a more generic perspective; and the translation of research results and management practices among these subregions.

National programs should set priorities in the allocation of the federal resources available, based on the criteria of national significance; ensure general standards of design and evaluation of management and research programs; acquire information of broad applicability; and facilitate the transfer of this information from research to management, and among the regions of our nation.

The interface between scientific understanding and management certainly needs improvement. However, the Administration's continued proposals to retreat from a role for NOAA in coastal resource management and in the effective translation between science and management within the Sea Grant Program are certainly counterproductive toward this goal.

Several recent assessments have been made related to the management of environmental quality, habitats and living resources. However, surprisingly little attention is being directed toward research on the nation's estuaries and coastal environments.

This is particularly true for basic research on critical environmental processes. This information produced by basic research is necessary for improvements in our understanding needed for the development of innovative management strategies.

In addition, we must make better use of the extensive capabilities which exist within the nation's coastal laboratories in research of a more experimental nature, and thus, greater predictive utility.

Numerous Federal agencies have a role in conducting and supporting research applicable to the coastal management.

The Environmental Protection Agency has been given broad new responsibilities under the Clean Water Act, and it should expand its activities and research programs accordingly.

The implementation of the forthcoming NOAA Estuarine and Coastal Ocean Framework should be strongly supported by Congress. Its success, however, will depend on filling the newly created position of NOAA chief scientist with a strong, well qualified scientific leader in order to pull the diverse elements of NOAA together to work on this common problem.

The National Science Foundation, our nation's basic research agency, has several coastally oriented initiatives, newly designed, under the Global Geoscience Initiative, to look at the issue of the effects of global changes.

This program could contribute to the fundamental understanding that I mentioned earlier that we need for effective management.

The Fish and Wildlife Service should be a partner with NOAA in research on critical coastal fish and wildlife habitats.

And finally, the Army Corps of Engineers should become a greater constructive force in coastal management, turning coastal engineering into a force for environmental and resource protection through such mechanisms as the one discussed by Senator Breaux, his proposed National Wetlands Act, wherein the Corps can use their engineering skills not only to preserve structures and property, but also to enhance and preserve environmental values and productivity over the long run.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, doctor. Your reference here to the NOAA Estuarine and Coastal Ocean Framework, can you elaborate on that? It is a good internal document and I would like to give some support for it. It seems to me a good approach.

Dr. BOESCH. Yes, sir. As you know, many of our Federal agencies are turning their attention to our estuaries, and EPA has been given substantial responsibility there. The Clean Water Act also indicates a role for NOAA in terms of providing research and understanding to help in management of our estuaries and their resources.

In trying to plan for that role, line elements of NOAA, the Fisheries Service, the National Ocean Service, and the like, in conjunction with academic researchers from the Sea Grant network, had several conferences to assess critical priorities and identify where the understanding was most needed the Estuarine and Coastal Ocean Framework looks at the range of needs, but also specifies those areas where NOAA can contribute most effectively.

These areas include such things as the coupling of our living resources with critical habitats, such as the wetlands. What would happen if we lost a certain percentage of our coastal wetlands in addition to that we have already lost?

What would happen if there is a modification to a certain small area of wetlands? Does it enhance or decrease its value to our fisheries?

Our knowledge of these relationships is often just at a very general, arm-waving level, and more effective, more detailed understanding could be used in more effective management.

The CHAIRMAN. Senator Stevens.

Senator STEVENS. I have no questions. Thank you very much.

The CHAIRMAN. Senator Breaux.

Senator BREAUX. Thank you, Mr. Chairman.

And thank you, Dr. Boesch, for being before the committee. Some of your information is really interesting. I mean, you are talking about the 1990 census revealing that upwards of three-fourths of the entire U.S. population living within 50 miles of our coastal area. If for no other reason, that should indicate the extreme value of that very fragile 50 miles, if three-fourths of the population is going to try and move in that direction, in that area.

The CHAIRMAN. If the Senator would yield, our projection was in 1970, when we had the hearings and Dr. Boesch, all of you all, were helping back at that time, we estimated that by the year 2000. Now we estimate it by the year 1990.

Senator BREAUX. It seems that that is certainly an indication that we as policymakers ought to be involved in ensuring that the very fragile area is going to be there for the people to reside in and for the natural resources to continue to exist.

I notice that you were not too complimentary about NOAA in your statement with regard to the fact that they do not seem to be looking at this area as a high priority area. On page 12 you say: "For too long, NOAA has not been aggressive or seemingly even interested in pursuing understanding and management of the coastal environment."

And they have got some real legislative responsibility in that area. But every year when their budget comes up, Mr. Chairman, it is more money for atmosphere, which is fine. We need it. But every year it is also a substantial decrease in ocean-related and coastal management activities. They are asking for less money.

And we are continuing to have more problems in that area. We have so many people agency-wide involved in this problem—EPA, the Corps of Engineers, NOAA. You name it, they have some jurisdiction. Is there a problem from your perspective in the fact that it has just gotten too scattered out all over the Federal government?

And is there a need perhaps for some consolidation or for some kind of a consortium, like we did back home, to try and put the interested people under one umbrella?

Dr. BOESCH. I think so. It is frustrating, I think, for everyone involved, for management agencies at the State and local level, and certainly for the research community, to have to deal with the diverse interests among the Federal agencies involved in coastal management one way or another.

On the one hand, it is difficult and it makes moving towards goals very inefficient. On the other hand, I am afraid that if we consolidate too much we would lose this plurality of interests.

However, it seems to me NOAA has a responsibility, compared to the other agencies, for speaking for the coast and the ocean. It looks at the problems that we have from the water toward the land from a shore-based perspective, such as permitting waste discharges.

So I certainly think there is an increased role for NOAA in that coordination activity. Frankly, having been involved in and witnessed several other coordination efforts that have been mandated by the Congress, one for example requiring coordination for marine pollution research, and seeing how that has really not worked the way that I think Congress intended, I am reluctant to propose that the Congress pass a coordination act for coastal management or coastal research.

One way I think, as I said in my testimony, that we can be more effective is to work cooperatively at a more local and regional level. And as you said, in Louisiana we now have a commission and an inter-agency task force involving both state and Federal agency representatives to try to work on coastal erosion issues.

And at that level, I think that all the players know the problems in more detail and can focus on them more directly.

Senator BREAUX. Let me ask a different question relating to what I think is obviously the most serious problem in this Nation.

That happens to be in the coastal area of Louisiana. We are losing 50 square miles a year, every year.

Is there anything that we can do to stop, slow down that process? I mean, without adversely affecting the very valuable interaction between the coast, the coastal salt waters, and the fresh waters of the coastal area?

Dr. BOESCH. Right. Well, as I said in my testimony, there are multiple reasons for our problem in Louisiana. The basic reasons are that we have managed the river for other purposes, other than as a natural system. We now have to manage the area as a Delta system as much as practicable, given the fact that we now have settlements and facilities within the broad Delta area.

We have to manage it so that it works more like a delta, and this involves diversions of the Mississippi River to introduce fresh water and sediment into badly eroding regions and into areas where salt water is intruding very rapidly. The Corps of Engineers, New Orleans District, does have plans for three major diversions, and I believe it is trying now to get to the top of the list within the Department of the Army and Congress for funding for those projects.

So those projects and similar activities could be very effective to reintroducing sediments which are needed for this Delta to continue to survive, because it exists in a rapidly subsiding environment.

The second area, of course, where we have had severe damage, and it has been a principal factor, is in the extensive canal development which exists throughout the Louisiana wetlands, primarily for the extraction of oil and gas and the transport of offshore oil from Federal territory into the inshore areas.

Not only are there direct impacts resulting from the fact that where there was a wetland there is now a canal and a spoil bank, but more seriously there are indirect effects resulting from alteration of the natural hydrology of the area, spreading this very serious problem.

And so it seems to me we need not only a better regulatory system for those types of activities, but also a proactive restoration program to repair these multiple wounds we have throughout the system, which continue to accrue effects through time.

Senator BREAUX. Thank you very much, and thank you for your continued help and work and dedication in this area.

Mr. Chairman, I think that he has indicated in one state why it is important to look at it from a national level. The reasons we have the problems are twofold: Number one, flood protection, flood control, where we drain two-thirds of all the waters of North America through one state, and other states benefit from that; and number two, bringing in offshore energy, which also benefits the nation as a whole, thereby I think establishing the fact, hopefully, that it is a national responsibility, at least a partnership arrangement between the Federal government and the state.

Thank you, Mr. Chairman.

The CHAIRMAN. I like his particular emphasis on research, because we go through various, you know, buzzwords. I remember two, three years ago it was solar energy, and I do not care what you put on the floor; if it was solar, everybody voted aye.

This year it is going to be research. We can get all the moneys we need. And heavens above, here is the administration—Senator Stevens and I just held hearings in the Appropriations Committee, and they are cutting the coastal zone management from a $40 million budget down to $5 million.

I mean, they are cutting out $35 million in assistance to the states and everything else. So your testimony is right on target. And if that is going to be the lack of interest, the professionals, the scientists in this discipline, are going to diminish. They are going elsewhere and get into other endeavors, and we will not have that valuable information on the beginning of life, which not only affects the oceans. Senator Kasten is interested in the Great Lakes area, and we are, too. That is very vital in our coastal zone management plan.

Thank you very much. Excuse me.

Well, thank you very much, Dr. Boesch.

Dr. BOESCH. Thank you.

[The statement follows:]

STATEMENT OF DR. DONALD F. BOESCH, EXECUTIVE DIRECTOR, LOUISIANA UNIVERSITIES MARINE CONSORTIUM, CHAUVIN, LA

I am the Director of the Louisiana Universities Marine Consortium, an organization of the state's public universities for research and education in the marine sciences. I have been actively engaged in basic and applied research on estuarine, coastal and continental shelf environments for nearly 20 years, having worked in the Chesapeake Bay region, the Gulf of Mexico, Australia and Asia. I currently serve as Vice-President of the Estuarine Research Federation and am a member of several national advisory boards and committees dealing with the science and management of the marine environment: the Marine Board of the National Research Council, the Advisory Committee for Ocean Sciences of the National Science Foundation (NSF), and the Scientific Committee of the Department of the Interior's Outer Continental Shelf Advisory Board. In addition, I have participated in numerous ad hoc planning efforts for Federal research and management agencies, notably the Environmental Protection Agency's (EPA) recently formulated Near Coastal Water Strategic Planning Initiative and the National Oceanic and Atmospheric Administration's (NOAA) Estuarine and Coastal Ocean Science Framework, which is nearing completion. In addition, I have experience in working with coastal and fisheries management and water quality agencies in several states in the transfer of scientific understanding to practical environmental and resource management issues.

I believe this experience has provided rich insight into the nature of this Nation's coastal environmental and resource problems, the management structures in place to deal with them, critical information deficiencies, the current state of estuarine and coastal research, and planned or proposed research and management programs. It is from this background that I am pleased to have the opportunity to address the National Ocean Policy Study Committee today and to provide assessments of (1) the current trends in coastal environmental quality and productivity in the United States, (2) our shortcomings in understanding and managing the coast; (3) critical research needs, and (4) the future roles of the various Federal research and management programs dealing with estuaries, coasts and continental shelves.

CURRENT TRENDS IN COASTAL ENVIRONMENTS AND RESOURCES

The coastal environments of this Nation are of inordinately great value to society, present and future. In 1990, three-fourths of the U.S. population will live within 50 miles of ocean or Great Lake coasts. This is no coincidence, but is a result of the diverse and bountiful opportunities the coasts offer for transportation, food, water, dilution of wastes, recreation and aesthetics.

Coastal environments are astoundingly productive. Approximately 70 % of the total U.S. commercial fisheries landings are species which are dependent on estuarine environments for completion of their life cycle and an even larger portion of the recreational catch is dependent on estuaries. The coastal resorts, parks, refuges are important ingredients in the quality of life enjoyed by the American people.

The cumulative impacts of the multitude of human activities in coastal waters and in the coastal drainage basins pose threats to these resources and the ecological systems which support them. These activities include waste disposal, transportation, coastal development, agriculture, and the extraction of both living and non-renewable resources, including oil and gas. There is a wide-spread belief among both the public and technical experts that, as a consequence, coastal environments are becoming seriously degraded and that the enormous value of their resources to society is being jeopardized. For example, in the Environmental Protection Agency's Near Coastal Water Strategic Options Paper (EPA, 1986) it is stated:

> "Near coastal waters are becoming more and more degraded despite existing federal, state and local laws and regulations governing coastal and ocean pollution and land and water uses. The environmental quality of near coastal waters will continue to decline unless changes are made in the way land and water uses affecting them are managed."

Although there are a few examples where regulatory control has resulted in improvements in environmental quality (for example, that which resulted from improved sewage treatment in South San Francisco Bay and reductions in DDT contamination off Southern California), these have been overwhelmed by more pervasive trends toward degradation. One could provide a long litany of specific examples: a steady decrease in landings of the eastern oyster, depletion of striped bass stocks in Chesapeake Bay, sediments and organisms heavily contaminated with PCB's and other toxic organic compounds in industrialized estuaries, disappearance of submerged aquatic vegetation in many east and Gulf coast estuaries, and tumors in fishes from polluted areas in Puget Sound, the Southern California Bight, the New York Bight, Boston Harbor and the Elizabeth River.

Two examples from my own experience serve to highlight the enormity of some of these problems. Coastal wetlands in Louisiana are being lost at an estimated rate of 50 square miles (80% of the land area of the District of Columbia) per year as a disruption of the natural processes which have built the Mississippi delta over the last 6000 years. This disruption is a result of controls placed on the river for flood protection, navigation and upsteam water use and extensive dredge and fill activities in the wetlands for oil and gas extraction. These wetlands are critical to the continued production of one-fourth to one-third of the Nation's commercial fisheries and a large portion of the continent's migratory waterfowl. Secondly, scientists from my institution have recently discovered the occurrence of extensive and persistent oxygen depletion of bottom waters on the continental shelf of the northern Gulf. Oxygen levels too low to support fish and shrimp were observed to occur from spring to fall and cover an area over 3,500 square miles during the summer months of 1985 and 1986. This occurs over one of the most productive offshore fishing grounds in the Nation. Available evidence suggests that this oxygen depletion has been exacerbated by the two-fold increase in nitrogen levels in the Mississippi River since the early 1960s, which is probably the result of fertilizer application and wastewater disposal in the Mississippi drainage basin.

Numerous studies have surveyed the set of problems and classified them (for example, the EPA Near Coastal Water Strategic Options Paper prepared in 1986, the NOAA Estuarine and Coastal Ocean Science Framework currently in draft, and the Office of Technology Assessment's Waste in Marine Environments draft report). In one form or another, the widely recognized effects which impact coastal waters, ecosystems and resources are

- toxic contamination which affects marine and estuarine organisms and poses risks to human health
- eutrophication, or enrichment with nutrients, which affects food chains and oxygen conditions

- o contamination by human pathogens, resulting in human health risks
- o loss and alteration of habitats critical to living resources, including wetlands, submerged aquatic vegetation and shallow water bottoms
- o changes in living resources as a result of overharvesting, pollutants or habitat changes
- o alterations to circulation and freshwater inflow, which affect salinity distribution, nutrient availability, sedimentation, and larval recruitment.

If this plethora of present day problems is not difficult enough to grapple with, consider the implications of predictions of global climate change in the coming century. Atmospheric warming resulting from the buildup of carbon dioxide and other greenhouse gases is predicted to result in a rise in global sea level of between one and three feet within 70 years. This has numerous implications not only for coastal structures erected by man, but also for intertidal wetlands and other important habitats and salinity distribution and circulation in estuaries. In coastal Louisiana and Texas, because of the already high rate of relative sea level rise resulting from land subsidence caused by both natural processes and withdrawal of subsurface fluids by man, the specter of an equivalent incremental rate of rise in sea level is already meriting serious consideration in coastal management.

SHORTCOMINGS IN MANAGEMENT AND UNDERSTANDING

The declines in coastal environmental quality and resources have continued over recent decades despite the existence of a variety of management programs such as Coastal Zone Management and the National Pollution Discharge Elimination System and Section 404 under the Clean Water Act. Of course, it probably is the case that these declines would have been more serious had these programs not been in place, but the central question is whether the failure of these Federal, state and local management and regulatory efforts to halt serious degradation is the result of lack of understanding of what should be managed to achieve this desired result or a result of structural or operational shortcomings in the management programs. The answer is both.

Let me quote again from the EPA Near Coastal Waters Strategic Options Paper:

> "The lack of a national policy for protecting coastal or ocean waters, conflicting governmental jurisdictions, gaps in interagency communication and coordination, insufficient funding and coordination of research, and limited integrative planning all present obstacles to the prevention of further degradation of our valuable coastal areas.
>
> Except for the Great Lakes and specific estuary initiatives there is no integrated planning. Instead, the agency has traditionally followed a permit-by-permit approach to decisionmaking. There are insufficient resources for program compliance and enforcement activities. Marine and estuarine research and development of criteria and standards have been lagging."

I strongly expect that the same points concerning the lack of integrated planning, case-by-case decisionmaking, inadequate enforcement of compliance, failings in interagency communication and coordination, and insufficient technical bases can be made about any Federal or state coastal management or water quality program. Part of the problem is that many of these are, for either statutory or operational reasons, permitting and not management programs. Part of the problem is that responsibilities are divided among agencies at both Federal and state levels. There is a trunk agency, a tusk agency, a leg agency, but which agency has responsibility for the

elephant? Consultations under Section 404 wetlands permitting provide a classic case of this sometimes confusing nexus.

Integrated planning of the type mentioned in the EPA paper is far more achievable at a regional level than at a national level. Thus the approach of Management Conferences which focus on specific estuaries as called for under Section 320 or the new Clean Water Act should be more successful. The successes and problems of such regional approaches involving multiple Federal, state and local agencies, including the Great Lakes Program, the Chesapeake Bay Program, and the new generation of Estuary Programs already underway (Long Island Sound, Buzzards Bay, Narragansett Bay, San Francisco Bay, Pamlico-Albemarle Sound) or specified under the new Clean Water Act, bear close scrutiny. The Great Lakes Program has met some success in achieving desired goals, while the jury is still out on the Chesapeake Bay Program.

Such regional planning can be geographically hierarchical. There may be a focus on a specific estuary or coastal area nested within a integrative planning mechanism which deals with a much larger region. An example of the latter is the still presently embryonic Gulf Initiative championed by Mr. Jack Ravan, Administrator of EPA Region IV. If successful this initiative will encompass the five coastal states (and possibly involve international cooperation), two EPA Regions, and several federal agencies. The advantages of such a broad view include the opportunity to comparatively apply technically-based criteria in the identification of subregions which deserve priority attention, the efficiency of addressing local problems from a more generic perspective, and the translation of research results and management practices among subregions. Such an approach may be particularly effective in the Gulf of Mexico region which has a large share of the Nation's coastal marine resources, is facing rapid population growth, is awakening to discover some major environmental problems and resource user conflicts, and has received relatively little attention from Federal research programs and thus has an extensive array of information needs.

If effective management is best done at a regional or local level what is the role of national programs within the Federal agencies? National programs should provide several critical functions: 1) set priorities in the allocation of Federal resources among the regions based on criteria of national significance balanced against the more parochial perspective; 2) insure general standards of design and evaluation of management and research programs; 3) acquire information of broad applicability through supporting high-quality national research programs; and 4) facilitate the transfer of information from research to management and interregionally. With regard to the first function, the EPA Near Coastal Waters Strategic Options Paper develops a sound protocol for focusing EPA attention under the near coastal waters initiative. The Agency should not, however, be constrained by the identification of a limited number of estuaries for priority consideration in the Clean Water Act. Objective criteria must be applied in determining priorities for allocation of scarce Federal resources.

As stated above, our current plight is also a result of shortcomings in the level of understanding needed for effective management. Below, I will briefly address research needs. However, acquiring new information addresses only part of this problem, which is also based on the difficulties in translating scientific understanding into application and in dealing with scientific uncertainty. From a scientist's view, managers seem to want to hold fast to conventional wisdom and find challenges to conventional wisdom--the heart and soul of the scientific method--disconcerting if not heretical. Scientists, on the other hand, need to better accomodate the manager's need for reasonable definition in the face of scientific uncertainty. The research-management interface needs improvement. This can be accomplished by better integration between agency research and management units, for example between EPA, NOAA and Fish and Wildlife Service laboratories and extramural programs and their management counterparts. An attractive approach to facilitation at this interface is the Estuarine and Coastal Ocean Network proposed in the forthcoming NOAA framework document previously mentioned.

On the other hand, the Administration's continued proposals to retreat from a role for NOAA in coastal resource management under the Coastal Zone Management Act and in the effective translation between science and management within the Sea Grant Program are counterproductive toward this goal.

CRITICAL RESEARCH NEEDS

Several recent assessments have been made of research needs related to the management of environmental quality, habitats, and living resources. The recommendations included are too voluminous to summarize here and interested parties are directed to the following reports for details:

> Technical Information and Research Needs to Support a National Estuarine Management Strategy. U.S. Environmental Protection Agency, Narragansett, RI, 1986
>
> NOAA Estuarine and Coastal Ocean Science Framework. Estuarine Programs Office, National Oceanic and Atmospheric Administration, Washington, D.C., 1987.

At present, surprisingly little attention is being directed toward research in the Nation's estuaries and coastal environment. This is particularly true for basic research on critical environmental processes. The National Association of State Universities and Land Grant Colleges estimated that in 1985 the total expenditure for basic research in U.S. estuaries from all sources totaled less than $15 million. Improvements in our understanding of the natural processes and their biological consequences and in the ability to separate these natural causes and effects from the effects of man is needed for the formulation of effective management strategies. Unless support for basic research on estuarine and coastal processes in increased, there will be little opportunity for the development of major, new innovative management strategies. In many management-oriented Federal research programs "safe" research and monitoring programs typically have been designed. Although these programs may be successfully completed, at best they will lead to incremental improvements in understanding, unlikely to significantly advance our ability to formulate cost effective strategies to conserve and rehabilitate coastal environments.

In addition, we must make better use of the extensive capabilities which exist in the Nation's coastal laboratories, including federal laboratories, university laboratories and research institutes, in innovative coastal research, both basic and directly management oriented. Research of a more experimental nature is needed in which natural conditions are closely duplicated. These require sophisticated instrumentation and analytical capabilities in close access to the coastal environments of concern. In this role, the coastal laboratories offer a well placed, but underutilized, window to the Nation's estuaries and coastal waters. Through networking of these laboratories, through mechanisms such as the newly created Southern Association of Marine Laboratories which includes all significant coastal research laboratories from North Carolina through Texas and in U.S. Caribbean island territories, direct access to virtually all U.S. coastal environments is assured.

ROLE OF FEDERAL PROGRAMS

I will conclude by briefly outlining my suggestions concerning the role of Federal agencies in conducting and supporting research applicable to coastal management. It is important to note that many of the suggestions coincide with plans being already developed within the agencies. My suggestions reflect views formed while working with the agencies in an advisory capacity, so the coincidence is not surprising.

Environmental Protection Agency has traditionally conducted and supported research directly applicable to its regulatory mission. This scope should continue and broaden as appropriate to the broadening of the Agency's regulatory mission under the new Clean Water Act. As a related effort to development of its National Estuary Program and Near Coastal Water Strategic Initiative, the EPA has identified specific research and technical information needs dealing with toxics, nutrients, microbial contamination, estuarine habitat modification and estuarine characterization. In addition, research elements will be included under each specific program in the National Estuary Program. It is important that these efforts be well coordinated. It is also important that the research efforts of NOAA called for under Section 320 National Estuary Program be well coordinated with the EPA programs. EPA will undoubtedly initiate its own programs dealing with issues amenable to regulatory control, such as toxics and nutrients, but should rely strongly on NOAA for assistance in areas of NOAA strength, such as fisheries resources and data-based strategic assessments.

National Oceanic and Atmospheric Administration has undertaken the development of a NOAA Estuarine and Coastal Ocean Framework which identifies research needs related to Circulation and Freshwater Inflow, Toxics, Nutrients and Pathogens, Habitat and Living Resources Declines. This research would be accomplished through several NOAA elements, including the National Marine Fisheries Service, Sea Grant, and the National Ocean Service. Commendably, this framework was developed through the close collaboration of both NOAA scientists and administrators and university researchers. The framework calls for immediately accelerated and expanded efforts in research on critical habitats and their functional value to living resources and on the reasons for declines in these living resources. Both NOAA laboratories and scientists and independent research scientists would participate based on a rigorous merit review system in order to maintain high and innovative quality in the research. A networking system would be instituted to facilitate the results of research to resource managers and the general public.

I heartily endorse the NOAA Estuarine and Coastal Ocean Framework and its implementation and urge Congress to insure that it is properly funded. For too long, NOAA has not been aggressive, or seemingly even interested, in pursuit of understanding and management of the coastal environment. This has left a major void in Federal efforts because the compelling responsibilities of other agencies are limited to specific resources (e.g. wildlife, water quality) or activities (e.g. point-source discharges). NOAA, through its diverse responsibilities under the Marine Protection, Research and Sanctuaries Act, Magnuson Fishery Conservation and Management Act, Anadromous Fish Conservation Act, Fish and Wildlife Coordination Act, Coastal Zone Management Act, and Clean Water Act, comes as close as any agency to having responsibility for the elephant, that is the environments and resources of the coastal zone.

I hasten to point out, though, that the Estuarine and Coastal Ocean Science Framework has little chance of succeeding unless a highly competent and respected scientist is chosen, and chosen soon, for the position of NOAA Chief Scientist which was created by the last Congress. Only through strong leadership in that position will NOAA be able to unite its diverse elements, insure interagency cooperation, and maintain the high standards of credibility desired.

National Science Foundation is the Nation's basic research agency. The NSF is embarking on a major Global Geoscience Initiative aimed at understanding the interconnections between the geosphere, atmosphere, hydrosphere and biosphere and the underlying mechanisms of global climate change. Three subinitiatives are relevant to coastal management issues: the Land/Sea Interface, which addresses relationships of land runoff, rivers and the coastal ocean and how these are changing dramatically throughout the world; Coastal Ocean Flux and Dynamics, which deals with the complex physical processes along the coastal margins of the ocean and how they affect chemical, geological and biological processes; and Recruitment Mechanisms, which addresses the interplay between physical processes such as currents and the variations in recruitment of marine organisms, including fish and shellfish. NSF's coastal programs will fill a critical role in

providing new understanding of fundamental environmental processes and placing coastal phenomena in a global perspective.

Fish and Wildlife Service has responsibilities for waterfowl and other wildlife prevalent in coastal environments. Consequently, FWS research needs focus especially on coastal wetlands, especially through the National Wetland Research Center. FWS should be supported to colead with NOAA research on the utilization and long-term vitality of habitats critical to coastal fish and wildlife such as wetlands and seagrass beds.

Minerals Management Service is responsible for oil and gas and minerals development on the Outer Continental Shelf. The MMS Environmental Studies Program has until recently concentrated on environmental information needed for preleasing decisions and dealing with environments. Newly articulated policies indicate that future MMS study efforts will focus on postleasing decisions, areas experiencing actual development, and long-term (including coastal) effects. I strongly endorse this new direction.

Army Corps of Engineers should become a greater constructive force in coastal management. Increasingly, the Corps should address the needs for coastal engineering for preserving and enhancing environmental values and resources, not simply coastal development and transportation. This need is presently apparent in coastal Louisiana, already a heavily engineered ecosystem, where the Corps has planned several diversions of the Mississippi River into adjacent estuaries to counteract saltwater intrusion and introduce sediments into subsiding wetlands. The Corps will need Congressional urging and support to move into this rather untraditional role. Senator John Breaux's Emergency Wetlands Restoration Bill requires the Corps to identify the Nation's most endangered wetlands (using objective criteria) and actively pursue restoration of these wetlands. Research at the interface of environmental science and engineering will be required to plan for and increase the effectiveness of this new field of Coastal Environmental Engineering.

In addition to the aforementioned agencies, other Federal agencies do and can contribute to the Federal coastal research effort. These include the National Aeronautics and Space Administration (remote sensing), Department of the Navy (environmental research with military application), U.S. Geological Survey (research on rivers and coastal geological processes), Food and Drug Administration (pathogens and toxic materials in seafood), and the Department of Agriculture (nonpoint sources of contaminants and nutrients from agricultural lands, wetland erosion).

The CHAIRMAN. We now have Bob Knecht, our former Administrator, Mr. Knecht of the Environmental Studies, University of California at Santa Barbara. Where have you been, Mr. Knecht?

STATEMENT OF ROBERT W. KNECHT, UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Mr. KNECHT. Well, I have been on the West Coast, Mr. Chairman, enjoying it immensely.

The CHAIRMAN. He administered, as we all know on the committee, our Coastal Zone Management Administration there for several years, and in a highly professional way. And we welcome you back to the committee.

Mr. KNECHT. Thank you very much, Mr. Chairman.

It is a real pleasure to see you again, and to welcome and see my old friend, Senator Breaux, and see him in his new position. It is an honor to be invited to be here.

Commenting on your last comment with regards to appropriations, it appears that we are at a stage in the game where we have government by "continuing resolution" or "refused rescissions", one or the other.

In any event, I will not repeat my statement. What I would like to do, however, is quote a couple of parts of my statement and then add some additional commentary based on what we have heard this morning.

In my statement, Mr. Chairman, I raise a number of questions that concern me about the current administration's policies with regard to coastal zone management. I think we would all agree that the program has come a long way since 1972, when under your leadership and Senator Magnuson's leadership, the 1972 act was put into place. The States have done an excellent job.

But we are now at the point where the administration, for the last half dozen years, appears not to be supporting the program. I want to raise a couple of rhetorical questions that I think should be put into the record.

Does it make any sense at all for this administration, with its strong effort to increase OCS oil and gas leasing, to seek year after year to cut support to the same state CZM programs that can provide the onshore planning necessary to support offshore oil development?

Does it make any sense for this administration to seek to reduce the states' role under Federal consistency when the coastal states so obviously need to be full partners with the Federal Government if sensible coastal and ocean management is to take place?

How can this administration fail to see that a well-supported and functioning state CZM program is critical to the planning and rational development of the nation's new 200 mile exclusive economic zone, which I believe is an expressed goal of this administration.

And lastly, how can this administration argue that coastal zone management should now be a purely state concern when nationally important issues, such as ocean incineration, ocean dumping, and ocean mining, all will require the kind of positive and continuing state-Federal partnership that was built into the Coastal Zone Management Act of 1972?

Suffice it to say, Mr. Chairman, that I think we have got a great start in coastal zone management and that the coastal states are continuing to do a good job, in spite of funding uncertainty and funding confusion produced by four rescission requests in a row, and in spite of the lack of sustained, constructive and positive support from the NOAA office concerned with coastal zone management.

I believe, Mr. Chairman, that problems exist at the national level in two particular areas: One, in the management style of the Federal Coastal Zone Management Office, now called OCRM; and two, in the failure of the Federal government to appreciate that state coastal zone management efforts represent an important national resource, and a failure to see that the coastal states must be full and legitimate partners with the Federal government in our next undertaking, ocean resources planning and management.

I have listed four recommendations in my testimony, Mr. Chairman, and I want to mention those briefly. In my view, four actions need to be taken by the Congress, by this committee, and the appropriate committees in the other house:

First, oversight of the Federal CZM program. Unfortunately, tension and mistrust seems to have replaced cooperation between the coastal states and NOAA. Coastal state managers indicate that problems exist principally in the processes used to amend state programs and refine state programs, and that is a continuing difficulty, and in the approach in evaluating state programs.

The goal should be a Federal CZM Office that distributes the money appropriated by Congress quickly and fairly, an office that works with the states and not against the states as they refine and improve their programs, and an office that evaluates state efforts critically but constructively. And I might add an office that is forward-looking, that anticipates the new ocean and coastal problems of the nation, like sea level rise and the other problems we heard this morning, with enthusiasm and with vision.

Secondly, re-strengthen Federal consistency. Early consideration should be given to an amendment to the Coastal Zone Management Act which makes it clear that Congress intended that that provision, the Federal consistency provision, be interpreted to apply broadly to the full range of activities in Federal waters which might affect a state's coastal program.

To elaborate that point briefly. Without the unambiguous application of Federal consistency to activities beyond three miles, the states are going to have to find other ways to get the legal leverage that they need to protect their legitimate interests.

For example, there is legislation pending in the other body to create a new ocean minerals regime in the EEZ. Now, the states are going to demand, it seems to me, that either Federal consistency clearly apply to ocean mining beyond three miles or that they get a specific role in the decisionmaking of the Interior Department with regard to that leasing, one way or the other.

It is also going to happen in ocean incineration if legislation comes up in that area. And we have the problem now in offshore oil and gas.

Three, the potential role of CZM and ocean resources management has got to be more seriously considered. I think that Congress ought to ask the Federal CZM office to study the kinds of roles that the CZM program and the coastal states should play in new and emerging ocean problems, like mining, toxic waste incineration, and waste disposal generally.

Surely these activities will affect the coastal states, and they need to be starting that planning now. The states have completed several studies on their possible role with regard to these activities. The Federal government action in this area is long overdue.

And my last point involves a national ocean policy review. As I mentioned in my full statement, I think it is again time to review national ocean policy. A lot has happened since the excellent Stratton Commission report of January 1969. The entire environmental movement has come and stayed. The energy crisis has come upon us. The entire body of law of the sea has been changed fundamentally—all of that since the Stratton Commission produced its report.

Ocean issues need to be re-examined broadly, not that we do not need to take action in other areas now, but in addition, we need to start the long range study.

Should the U.S. broaden its territorial sea to 12 miles, when, and on what basis? Is President Reagan's statement of March 1983 on ocean policy an adequate pronouncement of this nation's interest in the sea? What options exist for improving the partnership between states and the Federal government, and so on. Many issues could be listed.

Mr. Chairman, I would now like to add a couple of concrete ideas on what might be done in the near term to try to improve things.

I think the time is right now to begin regular national assessments of the coastal zone management program, to begin to see the coastal zone management program as a national resource in national terms.

So far, we evaluate each state program separately and we do it rather mechanically. But what we need to do is look across the board, across all state programs, to get a better idea of what we are getting in our national coastal zone management program—what we are getting for those $35 million a year. And we need to better understand how the national interest is served by the collective activity of these 29 coastal states representing 90 percent of the U.S. shoreline.

In the 1980 and 1986 amendments to the CZM Act, Congress clearly delineated nine national policy goals for coastal zone management. In those nine national policy goals, Mr. Chairman, there are clear statements of the national interest in coastal management: to protect coastal resources; to manage coastal development in hazardous regions; priority siting of energy facilities; and public access are four of them.

We need a regular assessment every year from NOAA as to how well the national CZM program is meeting this collection of national interest goals, so that we can see where the defects are and can determine whether or not we are getting the dollar's value for every dollar spent.

A second point and then I will close. I think it is time to begin development of an ocean zone management component to coastal zone management. Even though we have heard clearly this morning that the job of coastal zone management is not finished—we have major problems in erosion, major problems associated with sea level rise, with estuarine management, and so on.

Those jobs are not finished, but the world is not a simple place; we also have to begin to look ahead. And I remind you, Mr. Chairman, that some of the early versions of the CZM legislation considered in 1970 and 1971, had a Federal component of coastal management as well.

There was a state CPZ program out to three miles and a Federal program to coordinate Federal activities beyond three miles. That idea dropped by the wayside and was never incorporated into the legislation.

It is clearly time now, 15 years later, to reinsert the ocean emphasis in the program. Because of what the states have done, we are in reasonably good shape out to three miles. There are problems, of course. But beyond three miles, in the Federal waters, we have no systematic planning, we have no coordination between Federal agencies, we have no systematic effective link between Federal actions and state CZM programs and we have no Federal government focal point for pulling things together in ocean planning and management.

We have nothing out there but individual Federal agencies doing their individual thing, without coordination but with the potential for conflict.

It seems to me, Mr. Chairman, that some Federal office ought to be given the lead beyond three miles, as we have done with the States within three miles, and a process started to begin to develop a planning and management process for this region.

Obviously, coastal states with their CZM programs in place, with the expertise of their Sea Grant programs in place, have got to be direct and full partners with their Federal agency counterparts in any such effort.

It is equally obvious that NOAA is the agency that ought to have the role of pulling together the Federal ocean effort beyond three miles. Let us put the "O" back in OCRM.

That Office is the office of Ocean and Coastal Resource Management, but we see little ocean activity being done there so far.

In conclusion, I think there are many benefits to be gained from the present coastal management effort and improving it along the lines we heard this morning and I feel that there is much to be said for beginning to prepare for the ocean resources planning stage. Nothing, however, will be automatic and nothing will come easily.

It seems to me, therefore, Mr. Chairman, that your committee under your leadership has got to reassert itself in ocean and coastal matters. In the last half dozen years there has been drift and confusion in this area at the national level. Strong leadership is needed, and I think it can be provided by your group.

Thank you.

The CHAIRMAN. Well, your testimony is just A–1, a very splendid presentation, and I wish we could have you back. It is not a partisan thing. Our friend Senator Stevens has been a leader in this. Senator Weicker is just as frustrated as you are. He is at an earlier hearing at the appropriations level.

You talked about the Stratton Commission, putting that into an independent agency. I do not think that will pass. What we really need is personnel like yourself. I do not know the gentleman who is the administrator of the coastal zone management. He has not contacted this committee, and all they can think of doing is taxing it.

You mentioned Sea Grant. They redlined that in the appropriations area the day before yesterday, get rid of it, and yet they want to put in a license for someone walking down to the ocean who is trying to put out a fishing line. They want a Federal license. That is the only thing they can think of, and nonewhatsoever the impact like you have over there in California with respect to a very viable and dynamic coastal zone management group.

How about the offshore drilling and the impact that it has on shore, which started it all? You and I could just talk right along here.

You think the states have generally done a pretty good job. I guess it is us. In all candor, just two chairmen ago we had the whole ocean policy study. I used to be Chairman of the Subcommittee on Oceans and Atmosphere, and we do not even have that subcommittee any more. I wanted to, but I did not have room in the budget and everything else to start reinstituting that.

So what we are doing is taking the ocean policy study, and the only reason we have it is that a previous Chairman could not abolish it. It involved statutes, and it involved several commissions, and

they did not want to hear my filibuster. So that is why we have maintained the ocean policy study that we are presently meeting as.

Senator Stevens, you have been concerned. Look, when you talk about three-fourths by the year 2000 and now by the year 1990, we always used to hear that Alaska had one-third of the coastline.

Senator STEVENS. Half.

The CHAIRMAN. All right, you have gone up to a half. All right, I knew it would increase.

At the next meeting you will have it all.

Senator STEVENS. Well, I, too, Mr. Chairman, am glad to see our old friend back. I think the trip to the provinces has done Bob good. He sounds a little different than he used to sound when he was managing the Federal program, but I am confused with my friend. He on the one hand says that the State programs are not so bad, and on the other he is very critical of those of us who think that the States ought do to more within their three-mile limit and that the Federal taxpayers, now that we have started this program, need not support it to the extent that we have in the past.

I seem to hear on the one hand that we should have, and remember, I did support the Federal concept beyond the three miles, but the people who wanted the states to have this consistency provision knocked out the Federal control beyond three miles.

I cannot quite understand where you are going, my friend. I would support the concept of having a firm Federal program beyond three miles, but if you have the state consistency and you have the state veto from the inception, then I wonder where you are going.

Take oil and gas leasing. I do not know if you know this, but with the exception of the Beaufort Sea there has been no outer continental shelf development off of Alaska primarily because of the very point that you are raising, the question of the role of the states in terms of Federal consistency; nor do I think there has been any ocean mining off our shores since you left office because of the lack of a firm Federal authority to proceed.

As a consequence, your newly-adopted State blocked the reversal of the El Paso gas line so that we could send Alaskan oil from Long Beach into Texas and distribute it through the pipelines. We have now built a new pipeline across Panama. The Alaska oil that comes up the east coast costs every citizen more money, and the problem was State consistency. The state just would not allow that pipeline to be reversed and that oil to come into California and go to the Texas pipelines. We built a whole new distribution system at great expense.

I wonder sometime about the Federal role, and I am pleased to hear that you would support a Federal role in offshore development, offshore utilization, and I think it has to cover incineration and ocean dumping and the whole thing. I do not think the states that you are talking about that want State consistency would ever allow us to create that Federal authority out there. Do you?

Mr. KNECHT. Yes, I do. I think perhaps that I spoke too fast or tried to get too many things into my "five minutes", Senator Stevens.

In terms of the Federal role, there needs to be some pulling together of the various Federal agencies that are working in the ocean beyond three miles, so we would begin to get some coordinated planning and some coordinated program development.

When you talk about management, however, I want to differentiate planning——

Senator STEVENS. Let me interrupt you there. If you gave States the consistency provision from the very inception they would veto it anyway. Why create a Federal bureaucracy and let each coastal state veto what the Federal plan is?

Mr. KNECHT. No, I think we have the problem at the present time, respectfully Senator Stevens, because there is not a clear understanding of State responsibilities vis-a-vis Federal responsibilities.

The Supreme Court ruling of January 11, 1984 in *California* v. *Watt* took OCS leasing out of the purview of Federal consistency.

Senator STEVENS. But it left in any development, any exploration or development. All it took out was the piece of paper that was leasing.

Senator BREAUX. Would the gentleman yield? You are not correct when you say it took out leasing. It took out the sale, the leases that were awarded pursuant to that sale, and everything else has to be consistent with CZM and not the sale. There is a big difference.

Mr. KNECHT. There is a big difference. I think part of the problem is, however, that the Supreme Court decision has raised questions about the legal status of those Federal consistency provisions, what they do and do not apply to. We have had several more legal challenges since then, and the rulings have not been all that clear.

So what I am asking is that the Congress reconsider the matter and clarify, hopefully in the direction I would suggest, the broad interpretation, making it clear what Federal consistency applies to beyond three miles.

I think the problem at the moment is the states are unsure. Let me give two quick examples. We had the Interior Department trying to lease the Gorda Ridge for mineral activities off Northern California and Oregon in 1983/84. That was an abortive attempt because the state and local interests, fisheries, environmental, tourism, were not included. There was no way to include state and local interests in the decision-making so they rose up in arms, and the Interior Department had to pull back from that project. The states were not adequately involved.

We had EPA trying to do ocean incineration research burns. They got burned in that process and also had to pull away from that profit because the State and local governments are not yet adequately built into that process, I feel

I also claim that if you build the coastal States into the process early and with clearcut roles, they can be as positive as the Federal agencies in moving ahead. Everyone realizes we have to solve these problems. Hawaii is planning for ocean minerals development in a positive way, but they want to be part of the decisionmaking.

I do not think States are routinely and arbitrarily against these developments. They simply want a fair shake on decisionmaking that affects them.

Senator STEVENS. I would challenge you. I have been here almost 20 years. I will challenge you to find me one state through its government that has supported development beyond the three-mile limit other than Louisiana and Alaska.

Mr. KNECHT. The State of California.

Senator STEVENS. In terms of what development?

Mr. KNECHT. Offshore oil development.

Senator STEVENS. They opposed it every single time.

Mr. KNECHT. They have not.

Senator STEVENS. You know, I am a former Californian. You name me one instance where they supported it.

Mr. KNECHT. Exxon Corporation has the permits in hand from the County of Santa Barbara to proceed with three new platforms in Federal waters off Santa Barbara County, but they will not do it because they do not want to comply with local air quality regulations. The permits have been granted.

Senator STEVENS. But again, the state law gave those local counties the veto power. That is the problem. Once you give the state consistency provision, it goes right down to the county and on to the local city. I have a state that has half the coastline in the United States, and we have the problem of trying to get the State of Alaska to overrule some of the objections from various local areas, and I represent those areas, too.

You place a tremendous burden upon the people of a State government to overrule their constituents. I do not think California has ever overruled a constituent protest with regard to a development outside the state's limits.

Mr. KNECHT. No, the California Coastal Commission has expressly allowed at least 10 new platforms to be developed in Federal waters in the last decade.

Senator STEVENS. But they still have to be consistent with the local provisions.

Mr. KNECHT. They are consistent.

Senator STEVENS. They are not. They have not been built.

Mr. KNECHT. They are built. They are producing. They exist. You can go look at them.

Senator STEVENS. Well, I will be glad to go look at them. I know of no situation where California has overruled a local complaint under a local provision like the Santa Barbara situation or, as a matter of fact, neither has Alaska, neither has Louisiana.

Mr. KNECHT. Just one final point—you do request a great State with beautiful shorelines, and there are lots of different interests that have to be resolved.

Just the night before last I was sitting with a county official from San Luis Obispo County, north of Santa Barbara, and he said that his county is considering suing the State Coastal Commission. They are thinking about it because the Coastal Commission was allowing an oil platform to go forward that the county disagreed with. It happens.

Senator STEVENS. I am not glad to hear that, but what I am saying to you in my judgment is there ought to be a provision in the Federal law for the resolution of these disputes.

Just yesterday I had a visit with Former Secretary of Interior Udall. He and Robert Redford and others have put together a plan

for resolution of disputes in the Bering Sea. It does not happen to include the Federal government.

Mr. KNECHT. Yes. I am aware of that effort and was a part of the earlier planning.

Senator STEVENS. You know that it really does not get to the Federal Secretary of Interior until the last minute, and yet he is the one that is supposed to have the authority.

Mr. KNECHT. We need to improve a lot of things. I agree with you.

Senator STEVENS. What we need is a Federal disputes resolution mechanism that does not require every local town in every state to go to court every time anyone wants to use an area beyond the three-mile limit.

Now, we tried to get that in 1970 or 1971, and we did not get it.

Mr. KNECHT. I think you are right.

Senator STEVENS. I am pleased to hear you say we should have it. I am pleased to hear it, but you have to remember, good friend, you were there, and at that time you did not support that.

Mr. KNECHT. Well, the record may not be quite that clear. We will talk more about it.

The CHAIRMAN. We will come back to California in just a minute. Senator Breaux.

Senator BREAUX. Thank you, Mr. Chairman, and thank you, Bob, for being with us.

As I remember, there is a national interest override in the Coastal Zone Management Act, if the activity is determined to be in the national interest, the state CZM can be overriden. That is not done very often, but I think it is in the law.

You know, it is interesting. It depends on what issue you are talking about. I have had concrete examples, Mr. Chairman, of states that have asked the Federal government to overrule fishery management plans within three miles because they prefer the Federal plan.

Some of these states, when it comes to oil and gas, want the state to be able to overrule the Federal plan in Federal waters. If there is anything inconsistent about the Coastal Zone Management Act, it is the way states inconsistently look at it. Oil and gas is one way. The fishery management plans are the other way.

Now, you have some real outstanding recommendations. The concept of coordinated ocean policy is something that all of us have been working on for a long, long time, and Bill has flown around trying to coordinate. I happen to think they are still very essential.

I differ on page 4 with your statements on the recommendation that somehow lease sales should be made part of the consistency requirement of the Coastal Zone Management Act, and I do not think it is unclear. The law was very clear when we wrote it. It said any activity that directly affects the state is going to have to be consistent with the state's plan.

That covers exploration plans which directly affect the state. It covers production plans which directly affect the state. It covers pipeline corridors or refinery locations or sitings or any kind of pumping facilities with regard to oil and gas, but the Supreme Court, I think, has clearly said that a sale at which no one may be successful, there may not be a single signed agreement, that that

act in and of itself, that legal transaction at some office perhaps in Denver does not directly affect the State of California.

So I do not think we need to change anything. I think the law has been interpreted by the highest court, and it has been settled.

Mr. KNECHT. I do not think I said, Senator Breaux, specifically that lease sales ought to be included. I think that issue has been settled.

All I would suggest is that the myriad of other issues that involve other activities like incineration and ocean minerals ought to be confronted and the law ought to be clarified with regard to application of those activities.

Senator BREAUX. How would you suggest we do it in any other language other than enumerating specifically every possible activity that could occur in the Federal zone? We have chosen the words directly affecting the state, and then that is going to be a legal interpretation, and that means the courts are going to have to be involved.

Congress cannot spell out every activity in a 200-mile zone that has to be consistent with an individual state coastal zone management act. I mean, we do not have enough pages to write that.

Mr. KNECHT. Yes, I understand that. The problem at the moment is that almost every controversial case goes to court.

Senator BREAUX. Well, where else is it going to go?

Mr. KNECHT. Perhaps Congress did not get it precisely right the first time, and I do not think it unreasonable, after 15 years of experience, to reexamine the question. That is all.

Senator BREAUX. Do you have any suggestions of language that would be better than activities that directly affect the state?

Mr. KNECHT. Yes, sir, I certainly would be happy to submit suggestions. I have seen several variations and would be happy to do that if you like.

Senator BREAUX. Do you think any State should have the right to override an activity that has been determined to be in the national interest because that one State thinks it is not consistent with what they think is in the national interest?

Mr. KNECHT. No. I think that you will always need the national security escape clause as we have it now. The Secretary of Commerce or some Federal official ought to have that responsibility as it is now.

Of course, Secretary Baldrige is wrestling with that right now in the Exxon Santa Ynez case. It is tough, and I do not think he likes it very much, but he is doing it.

Senator BREAUX. Just one quick question. I cannot think of any example where that national interest override has ever been exercised. Can you?

Mr. KNECHT. Yes, there have been three or four cases so far where it has been.

Senator BREAUX. Thank you, Bob. We appreciate it and look forward to working with you.

The CHAIRMAN. I think the record ought to show, of course, John, that we have Federal approval of that coastal zone management before it is ever effective, so the feds have a signoff on every State's plan to begin with, and then we have that national security provision in there which has been employed by the Federal government.

Excuse me. Senator Wilson.

Senator WILSON. Thank you very much, Mr. Chairman. First let me say I am delighted that the committee is taking the time this year to review the operation of the Coastal Zone Management Act and inviting the distinguished witnesses that you have.

I think that the act has proven to be a valuable tool in California. I think it has helped in the wise management of our coastal resources, but I do think there are some problems, and I think Mr. Knecht's testimony has hit on one.

When the Supreme Court did hold that the Coastal Zone Management Act does not require OCS oil and gas lease sales to be subject to the consistency requirement—and I am not blaming the court, I am blaming the Congress—I think that we really need to remedy that, and I suspect you are at odds with my friend, John Breaux, because what we have now is a situation where the Interior Department can go through the entire two-year process, and the oil and gas companies in their prospecting can expend millions of dollars. The state, under that decision, the court's interpretation of Congressional mandate, has said that the state authorities need not be consulted in that process.

So we have a situation where the actual development plans, production plans, are subject to a consistency requirement but not the lease sale.

Now, that really is not very useful because it leads to the situation where, having expended these millions of dollars, the companies quite naturally complain. If the states say, well, the development plan pursuant to the lease sale here is not consistent with our coastal zone management plan and the oil companies say, but, you know, my God, we have spent millions, we have detrimentally relied.

To give you an analogy, it seems to me that when we authorize full-scale engineering development on a weapons system that we know we cannot afford, we are not doing something terribly responsible. In this case, we are allowing somebody else to do it and then setting up a situation where they can assert their having relied and expended enormous amounts of funds.

I think that is most unwise, and particularly because of the exact point the Chairman made a moment ago. We do in the scheme of things and quite properly have final say at the Federal level, but to not include lease sales, it seems to me, is to simply invite the kind of trouble that is in fact occurring.

The consistency finding that the Secretary is required to make in the Exxon case, I agree with Mr. Knecht, is a good example of the Federal authority having the last word. I hope the Secretary will decide in favor of the county, because I think that the county is not forestalling further development. They are simply attaching necessary standards, and I am convinced that they are necessary.

Now, let me just ask Mr. Knecht a question in this respect as a hypothetical; not very, though. Consider a situation where a plan has been approved that allows a rig to operate let us say 3.5 miles from the near high tide line and where the prevailing onshore breezes can carry the air above the rig onshore in a matter of minutes.

Do you foresee that development that close to shore would have the kind of impact that could lead a local air pollution control district in California to say that because of the change in the ambient air quality onshore, they cannot grant permits for onshore development?

Mr. KNECHT. I would think that could happen and, of course, as you know, you have come close to describing the Exxon Santa Ynez case. It might very well happen. The authority of that air pollution control district ends at three miles into the ocean, but they do have permitting authority over the necessary onshore facilities.

In a nonattainment area like Santa Barbara County we exceed Federal standards in ozone. So we have an existing air pollution problem, and the Air Pollution Control District has to try to protect and improve air quality. Yes, I think it could lead to that.

Senator WILSON. Does it make any sense to you, Mr. Knecht, that we have two federal agencies literally perhaps three miles apart administering a double standard? Does it make any sense to have the Department of Interior administering more lenient air quality standards over that rig three miles out to sea, when that air over that rig will in a matter of minutes be ashore where EPA has jurisdiction and administers more difficult, more stringent standards?

Mr. KNECHT. I think it doesn't make any sense at all, especially since if the local area exceeds EPA air standards and doesn't get back in line, our area could be subject to sanctions through no fault of our own.

It is an unfair situation and I think your legislation giving the jurisdiction beyond three miles to EPA is certainly an effective way to handle it.

Senator WILSON. Thank you.

The CHAIRMAN. I was just going to observe that I am agreeing with my distinguished colleage from California, save in one respect, the inference that oil companies are surprised, after spending all of these millions, the only time they ever were surprised was like the Mafia, they tried it on their own family. That Texaco-Pennzoil decision with a $12 billion verdict, that is the only time they ever got surprised but they know the law and they think money and power counts.

That is why they spend those millions to overcome the county.

Senator Breaux.

Senator BREAUX. I just wanted to ask, as a follow-up to Senator Wilson's question, would not that situation already be covered? I mean, any time we have—say it is an oil company outside the state boundaries, that when they go for their permit to do exploration or for their permit to do production, that that is the time that the question of air quality standards are going to have to be taken into consideration.

I think that is pretty clear that that directly affects the state. They would have to be consistent with the Coastal Zone Management Act. But my point is, if it ain't broke don't fix it. Do we not already have in place Section—what, 307–C–1 that says that operation would have to have a permit, that permit for exploration would have to be consistent with the Coastal Zone Management Act? Is that not the law?

Mr. KNECHT. Yes, we have that provision but what Exxon did is to build its processing plant not onshore but offshore, 3.1 miles, to evade direct local jurisdiction.

Senator BREAUX. Well, then it must have been determined that that activity does not directly affect the state.

Mr. KNECHT. That issue is now being decided by the Secretary. That it directly affects the state was determined by the Coastal Commission and they said no to the offshore facility.

Now it has gone to Secretary Baldrige for the Federal override. Those of us in California think it is clear that he cannot allow that Federal override because air standards will be exceeded.

The trouble is that Interior Department is allowed to set the air standards that apply in this case beyond three miles, not EPA. And Interior, when they set those air standards, they set them more leniently than EPA does inside of three miles.

Senator BREAUX. Are you worried about the consistency of the standard that is set?

Mr. KNECHT. The question is, does Secretary Baldrige look at Interior Department air quality standards or does he go one step further and look at the EPA-administered Clean Air Act and set his own standards and then make his determination? Then you have got the Secretary of Commerce doing air quality policy as well.

Senator BREAUX. I see your point. That is a valid point.

Mr. KNECHT. Could I answer one other question that you did not ask?

The CHAIRMAN. Please do.

Mr. KNECHT. I would have thought you would have asked, after Neil Frank's very compelling testimony, how is all this happening when we've got Coastal Zone Management in place?

The CHAIRMAN. Unfortunately I know. Go ahead.

Mr. KNECHT. Well, in some States the programs are not yet tough enough, clearly, and the setback lines are not far enough back. But you heard that in South Carolina they are being moved back. They have been already moved back in North Carolina.

It takes time to get the right technical studies and it takes time to get political support for such changes. But one other interesting thing is happening. I saw a recent article from New Jersey where they have their shoreline from Sandy Hook to Cape May armored with buildings and seawalls and all the rest of it.

Hence, they do not have a lot of flexibility, but they are beginning a program where if damage occurs there will be a buy-back program and eventually, if there is enough damage, those prices will be low enough so that the local government or the state government can buy the properties at risk and create open space gradually.

I think that is one hope for the problem. If you have got enough destruction often enough the values are going to go so low that even government can buy the properties back and eventually create open space and cause a kind of systematic retreat from these exposed areas.

The CHAIRMAN. I have not thought of it long enough, but is that a reasonable approach, to say rather than the height, the set-back requirement—from your experience, what would you recommend? I can see if you can get that set-back requirement on federal insur-

ance, flood insurance, somebody can come around and say immediately, my house is out there and you have immediately diminished my property, it is taken without compensation, and all these other questions would come.

But, I would hope we might be able to fashion a law, if that is sensible—does that sound sensible? It sounds too simple to me, if we just put that rather than the height, we have to move them back. I mean, we have started a movement.

Mr. KNECHT. Well, the height and the set-back are correlated by the slope of the beach. Obviously, they are one and the same thing.

The CHAIRMAN. But we are not getting them just to set it back irrespective of the slope of the beach. It could happen either way.

Mr. KNECHT. That is right. I think it would help. I think what you probably need is an array of solutions, with the short term solution something like that. Longer term studies of sea level rise should lead to programs that eventually would move people back permanently from the exposed areas. But in the meantime I think what you are saying is right, I agree with that.

One other thing surprises me, Mr. Chairman. We have EPA taking the lead on sea level rise studies and so on, when I would have thought that this is such a natural problem for NOAA. NOAA is doing the research side of global climate modification. NOAA is the ocean agency. NOAA is the coastal zone management agency.

Why do we see the research and the search being pursued by EPA?

The CHAIRMAN. Well, they are trying to abolish NOAA. That is clear from all of their budgets and everything else. We will get Senator Wilson and Senator Breaux to put them back in business.

Do you have anything more, Pete?

Senator WILSON. No, thank you, Mr. Chairman.

[The statement follows:]

Statement of Robert W. Knecht, University of California, Santa Barbara

Mr. Chairman, I very much appreciate the invitation to appear before you today on the subject of coastal zone management. I commend you for scheduling a hearing on this important topic early in your legislative agenda.

This morning I believe I can be most useful by taking the long view of the CZM program -- by recalling the situation that existed in the late 60s and early 70s prior to the passage of the Coastal Zone Management Act -- by recounting the goals and aspirations that we shared when the CZM program was launched in October of 1972 -- by noting the very considerable progress made by the coastal states as they completed and implemented their management programs -- and, finally, by commenting on the present management of the national effort by NOAA and its Office of Ocean and Coastal Resource Management (OCRM).

Life Before the Coastal Zone Management Act of 1972

Mr Chairman, as you well know, the 60s were a time of rapid development of the nation's coastal zones. Great areas of our richest natural resource -- coastal wetlands -- were being dredged and filled for shopping centers, second homes, and what have you. Contaminated estuarine waters had caused the closure of thousands of the most productive shellfish beds and recreationists were having an increasingly difficult time getting to our public beaches as hotels and large resort developments acquired and closed off the best coastal sites. And decision-making with regard to the siting of water-dependent energy facilities was virtually paralyzed as environmentalists and developers locked horns on one project after another.

The trouble was that no one had the authority or motivation to plan and manage the coastal zone as a whole. The local, state, and federal governments all had only a piece of the action and there was precious little coordination and planning going on among them.

The report of the so-called Stratton Commission, issued in 1969, confronting the coastal crisis, recommended that a national effort in coastal zone management be established and that the lead be offerred to the coastal states. With the help of federal grants, the states were to develop and implement management programs which took full account of both the national interest and local interests in the nation's coastal zones. The concept seemed a reasonable one and under your leadership and that of Senator Magnuson, the Coastal Zone Management Act of 1972 (CZMA) became a reality. I realize, Mr. Chairman, that I gloss over three years of hearings and debate, and a fair amount of political give-and-take in this thumbnail account of the history of the CZMA.

The Hopes and Aspirations of 1972

We were all excited in 1972. Congress has passed a landmark piece of legislation. For the first time, Congress was declaring a national interest in coastal land and water use decisions that theretofore had been seen as primarily local in nature. For all the reasons well known to this committee, the legislation declared that the coastal zones of the nation were a unique and valuable national asset whose conservation and development were of concern to all Americans.

Those of us involved from day one of the program sav great promise in the basic thesis of the CZMA — that a strong and positive state-federal partnership was the only way that sensible and sensitive coastal planning and management could take place. Further, we were intrigued by the underlying quid pro quo offered in the legislation. The federal government was saying to the states -- if you bite the bullet and adopt effective and enforceable management programs which apply to the state and local level and also accommodate the national interest, we will require the federal level to be consistent with your program as well. In effect, state CZM programs were proposed to be used to help ensure that federal coastal and ocean activities were conducted in an environmentally sound manner. And in straight-forward

language, federal agencies were directed to cooperate fully with the coastal states as they developed their CZM programs.

Would it work? No other legislation had gone this far. Would federal agencies conform their coastal activities to meet the policies of the states? Remember too that the CZMA had all carrots and no sticks. Would the carrots (federal grants and the promise of federal consistency) be seen as a sufficient incentive to get coastal state participation?

Hence, Mr. Chairman, we were, at one and the same time, enthusiastic and optimistic but also a bit apprehensive. After all, while the nation's coastal problems were very real and increasing, the approach built into CZMA was new and untested.

Mr. Chairman, as you will remember, we had many occasions to work together during the next 7 to 8 years. The President that signed the CZM Act into law failed to request the funding to start the program, preferring instead, he said, the kind of national land use program which would have totally diluted the coastal emphasis which was so urgently needed. A way was found to solve that problem and most of the remaining problems that were encountered in the early days of the effort. Perhaps the biggest challenge to the program was presented by the energy crisis that erupted in the mid-70s and the addition of the Coastal Energy Impact Program (CEIP) to CZMA in 1976 appears in retrospect to have been a reasonably successful response. It must be admitted, however, that coastal energy issues remain, eleven years later, probably the major tension in coastal zone management.

Looking back, we can see that the program grew stronger and more resilient as it wrestled with its problems. One of the great strengths in those days was the remarkable degree of constructive interchange between the Congress and the CZM program. The coastal states, our federal office (OCZM), and the committees of Congress on both the Senate and the House side, all were working toward the same goal — strong and effective state coastal management programs which protected state interests and, at the same time, adequately accommodated the national interest in the shorelines of the nation.

A talented set of state CZM managers like Wayne Beam of your state, Mr. Chairman, and Mike Fischer in California, Rich Delaney in Massachuetts, Art Rocque in Connecticut, Chris Shafer in Michigan and many others did the real work of CZM during that period — converting the promise of the legislation into the reality of improved coastal resources management. Indeed, today more than 90% of the U.S. coast is being managed by 29 states and territories under a set of state programs which meet the standards you set in the CZM Act of 1972 and its later amendments.

We have seen, however, that putting effective coastal zone management programs in place is a tougher job than we had imagined. Political resistance was often encountered from local coastal governments which failed to appreciate the need for strong state policies and development interests found countless ways to slow down or derail the process, up to and including litigation. And, unfortunately, federal agencies were not always as helpful as they might have been. So while the work took longer than originally expected, it was done, and, between 1974 and 1980, CZM was institutionalized into the coastal decision-making processes of most coastal states.

The Present Situation

I'm sorry to say, Mr. Chairman, that the situation today, 1987, is mixed. While the coastal and ocean problems (and opportunities) facing the nation are greater than ever before, the national CZM program appears to be unfocused and drifting. Indeed, the present federal managers of the CZM program do not seem to support the goals of the CZMA, at least as I have understood them. The bright spot remains the strength and vitality of most state CZM programs, this in spite of 6 years of sustained effort by the current Administration to eliminate federal funding of these programs. Clearly, the strong effort by the Congress to protect this funding has been critical to the survival of state programs.

The integrity of the coastal management process has also been threatened by the 1984 Supreme Court decision which held that offshore oil lease sales on

the OCS are not covered under the federal consistency provisions of CZMA. I believe that one of the factors that influenced the Court in this still controversial decision was the fact that the Administration apparently had changed its position on this key issue shortly before the litigation. I feel that this weakening of one of the key "engines" of the CZM process should be repaired by Congress as soon as possible.

Mr. Chairman, it is tempting to rail against what appears to me to be failed policies and missed opportunities by the current Administration. For example:

— Does it make sense for this Administration, with its strong effort to increase OCS oil and gas leasing, to seek, year after year, to cut support to the same state CZM programs that can provide the onshore planning necessary to deal with offshore oil impacts?

— Does it make sense for this Administration to seek to reduce the state role under "federal consistency" when the coastal states so obviously must be full partners with the federal government if sensible coastal and ocean development is to take place?

— How can this Administration fail to see that well-supported and functioning state CZM programs are crucial to the planning and rational development of the nation's new 200-mile Exclusive Economic Zone (EEZ), an expressed goal of this Administration and one which will benefit the nation as a whole?

— How can this Administration argue that CZM should now be a purely state concern when nationally important issues such as ocean incineration, ocean dumping, and ocean mining all will require the kind of positive and continuing state-federal partnership built into the CZMA?

The weakening of the CZM program under the current Administration has come at a time when ocean issues are again attracting considerable attention. During the 70s, almost a dozen other pieces of ocean legislation were enacted in addition to CZMA and sufficient time has elapsed now so that we can see how well they appear to be working. For the most part and with the striking exception of CZMA, this body of legislation is single-purpose in nature with each Act dealing with a particular ocean use or resource -- offshore oil, fisheries conservation and management, marine mammals, deep water ports, etc. Increasingly, we are seeing tensions develop between these separate

programs, in part because there are very few devices built into this legislation for the early identification and resolution of conflicts. A working federal consultation mechanism and a comprehensive federal consistency process under the CZM program, however, would go a long way towards easing these problems.

The importance of a strong and workable federal consistency provision can also be seen in connection with certain emerging ocean uses. Legislation has recently been introduced in the House which proposes to create a new legal regime for ocean minerals exploration and exploitation in the EEZ. From the debate so far, it appears that coastal states will demand either the unambigious application of federal consistency to these activities or that affected coastal states be given an explicit role in the federal decision process. The states could be expected, I would think, to take a similar position with respect to ocean incineration when and if legislation is proposed to deal with that controversial issue.

Mr. Chairman, I believe that what I have said this morning amounts to an argument that it is once again time to take a hard look at the nation's coastal and ocean programs. Twenty years ago, the Stratton Commission did an outstanding job but much has changed in the intervening years. The environmental movement has come and stayed. Energy concerns not on the 1969 agenda at all, will continue to dominate the years ahead. And the international law of the sea has been forever changed by the LOS deliberations which occurred entirely after the Stratton Commission had completed its work.

With the centralization of much of the nation's ocean program in NOAA in 1970 and with the passage of CZM in 1972, it was thought that the stage was set for a tighter and better coordinated national ocean program. And for much of the 1970s, this was more or less the case. But clearly there has been some back-sliding since then. NOAA's preeminence in ocean and coastal affairs is slipping. The Department of the Interior runs the new coastal barriers program, a vital link in effective CZM, and EPA is expanding its efforts in

the management of important estuaries while NOAA's ocean research budget shrinks and its fisheries and coastal management efforts continue to face serious cuts.

In view of what I've said above, Mr. Chairman, I see four actions that need to be taken by the Congress at the earliest opportunity.

1. Oversight of the federal CZM program - Unfortunately, tension and mistrust seem to have replaced cooperation between the coastal states and NOAA. State coastal managers are indicating that problems exist in the processes used to approve program amendments, in the approach used for program evaluations, and in the administration of the grants program. Further, there is evidence that the federal office now has a distinct bias in favor of coastal energy development, sometimes at the expense of coastal resource protection. Some tension between the two levels of government is inevitable given different roles and responsibilities. Now, however, it appears that agreement on the overall objectives of the CZM program is lacking as well. The goal should be a federal office that distributes the funds appropriated by the Congress quickly and fairly — an office that works with the states, not against them, on program refinements and amendments and one that evaluates state programs critically but constructively.

2. Restrengthen federal consistency -Early consideration should be given to an amendment to CZMA that makes it clear that Congress intended that the federal consistency provisions be interpreted to apply broadly to the full range of activities in federal waters which might affect a state's coastal zone.

3. The potential role of CZM in ocean resources management - Congress should ask the federal CZM office to study the kinds of roles that the CZM program and the coastal states should play in emerging ocean activities such as ocean mining, toxic waste incineration, and waste disposal generally. The states themselves have completed several studies of this type; federal government action is overdue.

4. A national ocean policy review - As mentioned above, it is again time for a review of national ocean policy. Is President Reagan's March 1983 policy pronouncement an adequate statement of our national interests in the sea? When will conditions be ripe for the U.S. to broaden its territorial sea to 12 miles? Should the state-federal jurisdictional split be affected by such a move? Will increasing ocean use and conflict force us to move away from the existing single-purpose approach to ocean resources management? What options exist for improved planning and management? What role should the coastal states play? I urge your support of the legislation now pending to create a national ocean policy commission to address these and other ocean issues.

Mr. Chairman, I think that we were uncommonly lucky in 1972. A piece of legislation was drafted and enacted into law which started a building process that continues to this day, almost 15 years later. State capacity to deal with coastal planning and management issues has been vastly improved during this period. Coastal states now have an organizational focal point and a process for ensuring that necessary coastal development meets the standards of good coastal practice and that sensitive resources receive the protection they deserve.

Seen in the larger perspective, Mr. Chairman, what the CZM program has done is to lay a foundation in the coastal states that, in principle at least, will allow them not only to play a positive and constructive role in the conservation and development of coastal resources but eventually of ocean resources as well. But these benefits will not flow automatically.

I believe that it is of the utmost importance that your committee, Mr. Chairman, reassert itself in coastal and ocean affairs. The drift and lack of focus of recent years have not served the nation well. The impasse in the offshore oil program, the uninspired direction of CZM, the uncertainty in ocean dumping policy, the ocean incineration pullback, and the confusion in ocean mining jurisdiction are indicative of today's problems that require the kind of leadership that you and your committee can provide. And tomorrow's problems are likely to be even more demanding. I stand ready to help your committee in any way that I can. Thank you for the opportunity to testify today.

The CHAIRMAN. Thank you very much for your outstanding testimony. We have also for the record testimony we wanted to put into the record of a couple of other witnesses.

Other than that, the meeting is adjourned.

[Whereupon, at 11:35 a.m., the committee adjourned, subject to the call of the Chair.]

ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

STATEMENT OF DR. B.J. COPELAND, NORTH CAROLINA STATE UNIVERSITY

Thank you. I am B.J. Copeland, Chairman of the NASULGC Marine Division Federal Relations Committee and Director of the North Carolina Sea Grant Program.

I appreciate the opportunity to present testimony on the value of our coastal zone and to verify the role of research in assisting our nation in enhancing that value. I am presenting this before this important committee on behalf of the Marine Division of the National Association of State Universities and Land-Grant Colleges (NASULGC) and the Sea Grant Association. The nation's civilian coastal ocean agenda for the next decade will be heavily impacted by your findings on this issue and the actions you take in response to that.

The Marine Division of NASULGC is composed of 90 major marine research and education institutions in the United States, which are committed to the understanding, conservation, and development of the ocean and coastal environments. The Sea Grant Association consists of 40 colleges, universities, research centers, industries and consortia, all dedicated to enhancing the nation's capability to develop, use and enhance our marine resources. NASULGC is composed of 149 colleges and universities with a total enrollment of approximately 3 million students.

BACKGROUND

The extensive estuaries bordering the ocean and Greal Lakes shores of our nation are valuable national resources. They form buffer zones between the land and the ocean or lake and they serve many vital functions. As a mixing zone they bring nutrients and vitamins from the land to the marine organisms of the sea. They are nursery areas for many of the important animals that constitute our nation's fisheries. As buffer zones, estuaries blunt the dispersion of pollutants and sediments from the land into the ocean or Great Lakes. Aesthetically, they offer attractive sites for marinas, homes and recreation. As protective embayments, they often are the site of major ports and heavy industry and are important to national defense. It has been predicted that within ten years 75% of the entire population of the United States will live within 50 miles of the ocean or Great Lakes. These large numbers of people lead to intensive, varied and often conflicting uses of estuaries; uses which already have resulted in degraded environmental quality and have contributed to substantial reductions in living marine resources in many areas.

Because of the enormous importance of the coastal area to society resulting from the numerous and varied purposes they serve, and because of the stressed nature of many of them resulting from these multiple and conflicting uses, it is not surprising that society is demanding that government direct its attention towards protecting and, when necessary, rehabilitating these valuable natural resources. It is also not surprising that this attention has been directed at developing strategies to stop pollution and enhance the aesthetic values and living resources of the estuaries. Our elected officials at all levels have responded to citizen demands for action and generated federal and state programs for protecting and managing our estuaries. Most of these programs, however, have been designed to manage the estuaries or provide a reactive response through permitting exercises. These have been only marginally effective in improving our ability to enhance, because not enough attention has been paid to fundamental research to provide the predictive capability necessary for effective management programs.

The management of these most complex and variable segments of the world ocean is a formidable job. Those with whom we charge this enormous responsibility must be provided access to the best scientific and technical information available at any given time and must be assured of a constant flow of new knowledge. Management is a dynamic process, one which depends upon information. With greater knowledge,

the limits on what is possible are extended, and the likelihood of making appropriate and effective management decisions is increased.

While significant advances have been made in our understanding of how estuaries operate, effective management remains impeded by our level of ignorance. Our fisheries harvest, for example, continues to decline, carrying capacity of our land and water are often exceeded, and economic return sometimes suffers. Until our knowledge of estuarine processes is increased substantially, the uncertainty as to which management strategies to apply and what results to expect from a given strategy or a combination of strategies will remain high. The only way to reduce uncertainty is to improve understanding through research; research at the most creative levels possible.

At present, surprisingly little attention is being directed at research in the nation's estuaries. Large amounts of money are being spent on estuarine programs, but little of it goes to research: of that which does, competitive, long term, research that could lead to major breakthroughs in our understanding of estuarine processes and problems is limited. The overall price tags for these programs are large, and the popular perception is that estuarine research funds are plentiful and that academic scientists should work from within and through these coordinated estuarine programs. As a result, not only do the existing large federal estuarine programs provide little direct support for research, they often impede the efforts of academic scientists to secure research support from other agencies. In practice, present programs do not take advantage of the tremendous national resource of academic scientists to do research on important, fundamental, priority questions. Academic scientists are largely excluded from partnership in the design and execution of these programs.

As you will see, existing federal programs are fragmented. Even where they address research needs, it is normally in a piecemeal, usually short-term fashion.

STRATEGIC MANAGEMENT NEEDS

The Sea Grant College Program, serving as a network of 300 colleges and universities throughout the nation, has built an effective network to respond to strategic management needs through fundamental research and technology transfer. The Sea Grant Colleges are uniquely positioned to effectively assist the vital partnership between the federal and state agencies by providing the generation of new, relevant information. Academic scientists should be encouraged to play major roles as partners with state and federal agencies in research and monitoring of the estuaries. Currently the major source of support for basic research in our nation's estuaries, the National Sea Grant College Program is the most effective of existing mechanisms for forging this partnership among the federal government, the states and the academic community. This capability should be exploited in the design and conduct of comprehensive federal estuarine programs.

We have recently been working with NOA's estuarine program office and other scientists within the NOAA network to identify and focus new estuarine research initiatives that are needed to manage our nation's estuaries. This development is based on a series of strategic management priorities identified by a combination of state and federal managers:

To describe the relationships between physical and chemical variables and productivity of estuarine ecosystems.

To understand chemical and biochemical processes in the estuarine environment as they are affected by the introduction of foreign substances, especially pathogenic materials and toxic chemicals.

To develop appropriate measures for ameliorating undesirable effects and to reclaim damaged estuarine habitat.

To develop the means to increase the harvest of fisheries products.

To improve the economic return of land around the estuaries by resolving the conflict between land use changes and estuarine productivity.

To determine the true economic value of estuaries in their alternative uses.

To determine the optimum stream flows in the estuaries that will maintain native populations and habitat functions.

To understand estuarine responses to nutrient enrichment.

To develop technologies for resolving estuarine processes and problems.

We stand ready, Mr. Chairman, to assist this vital attempt to improve the nation's ability to optimally utilize our valuable coastal resources. We believe that this value can be enhanced by applying new knowledge in innovative ways to improve our management strategy. Creative research, the kind that has become the trademark of our Sea Grant Colleges, is the key to realizing this goal.

At your invitation, we would be pleased to offer specific approaches for your consideration.

Thank you for your support of the Sea Grant College Program and for the opportunity to offer our thoughts. You are embarked upon an important quest, and we are pleased to be working with you.

STATEMENT OF EDDIE SMITH, OWNER, GRADY-WHITE BOATS, INC.

My name is Eddie Smith. I am the owner of Grady-White Boats of Greenville, North Carolina. We manufacture family sportfishing boats from 19 to 25 feet in length and employ 365 people. I appreciate the opportunity you have provided today to present a short statement and to share with Committee members and panelists our industry's insights regarding the importance of coastal resources to our Nation and its economy, to highlight existing problems and to discuss practical means to assure the protection and health of our Nation's coastal resources. These coastal resources are important to my industry—boating, to the sport fishing industry, and to all Americans who live, work or vacation along our coasts or use the services and products derived from our coastal environments.

Mr. Chairman, recreational boating is big business in North Carolina. In 1985, $70 million were spent on boats, motors, trailers and accessories sales in our State and $4.2 billion were spent on these items nationwide. In 1986 over $14 billion was spent at retail nationwide for all recreational boating expenditures including boats, motors, trailers, accessories, fuel, insurance, docking, repair and storage.

We have 202,000 registered boats in North Carolina. The vast majority of these boats are used along our coast, in our sounds and coastal waterways. There are currently 9.4 million registered boats across the United States and 14 million total watercraft. The industry continues to grow, the popularity of watercraft increases and the need along our coast for boating access, marinas, launch ramps, and so forth continues to grow as well.

Mr. Chairman, one of the most important natural resources of our coastal areas, which is often overlooked, is our fishery. The fishery is in a state of steady decline due to pollution, fresh water runoff due to clearing of timber, and over fishing by foreign and domestic commercial interest. It is imperative that steps be taken to preserve and enhance America's fishery for both recreational and commercial fishing interest. This is an area where our government's efforts and investments can pay immediate dividends.

From only the sport fishing standpoint alone, in my home state of North Carolina $305 million were spent directly on saltwater sport fishing in 1985. The industry employs 7,200 full time equivalent employees and pays $136 million annually in wages. Nationwide $5.2 billion were spent on saltwater sport fishing in 1985. Across the U.S. the sport fishing industry employs 120,000 full time equivalent employees and pays $2.3 billion in wages annually. Over 12 million Americans participate in sport fishing annually. A 1985 Gallup Poll reveals that recreational fishing is America's second most popular outdoor recreation pursuit. Among adult men it ranks as the number one recreational activity. Anything that can be done to stop the decline in our fishery will be beneficial to current and future generations. The tremendous economic impact of sport fishing alone dictates that this critical matter receive our immediate attention!

That recreational boating, sport fishing, swimming or beach vacations are popular activities for Americans is not new news to you Mr. Chairman, to your Committee members or to the panelists here today. Our recreational boating and sport fishing industries are big because outdoor recreation is important to American society. Coastal recreation is closely associated with our nation's consumer spending preferences, with our lifestyle and with our values.

In my view the continued biological and ecological health of our nation's coastal resources is a paramount national priority worthy of your time and attention. The perceived health and vitality of our waters, shellfish beds, welands, beaches and our vast fisheries resource is the foundation upon which Americans find pleasure and satisfaction in recreation along the coasts. The quality of the resource and the rewarding nature of the recreational experience, in turn, is the basis of our industries' success and ultimate profitability.

I have observed the enactment of many federal programs to deal with coastal resource issues over the past fifteen years—the Coastal Zone Management Act, the Wallop-Breaux legislation, the Clean Water Act—to name a few. I have witnessed programs to balance onshore development and programs to promote economic growth, programs to restore fisheries habitat and programs to enhance fisheries con-

sumption. Each initiative has had its shortcomings but each has had its successes, too. However, Mr. Chairman, the pressure on our coastal resources for recreation, for development sites, for beach and boating access has never been greater, nor has the pressure ever been greater on our fishery. Added to this is the growing awareness that toxic chemicals accumulating in wetlands, estuaries and near critical habitat must be effectively dealt with in order to assure long term resources vitality. I submit to you that these demands on our fragile coastal resources will require the best of business and government leaders to accommodate economic growth and change along our coasts.

In summary, recreational boating and sport fishing along our coastal areas is a high dollar, high employment, clean industry that should be enhanced in any way possible. We should also not overlook the fact that coastal recreation does not benefit only businesses along the coast, but also many large and small businesses inland. In my industry alone there are many manufacturers located far inland in coastal states as well as many many more in states that do not even border our coastlines.

I understand that this Committee will evaluate the performance of Federal and State coastal management practices on another day. I am proud of North Carolina's record in protecting our coastal resources and believe that our State's leadership will ably meet the challenges that confront us in the coming years.

I would welcome any questions that you may have concerning this vital issue.

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